C 1 1 1985

594-C-39

FEM 1.209-445399

# FLOOD INSURANCE STUDY

ORIGINAL

COMPLETED

## TOWN OF JAMESTOWN, RHODE ISLAND
### NEWPORT COUNTY

FEBRUARY 19, 1986

Federal Emergency Management Agency

COMMUNITY NUMBER - 445399

BEST COPY AVAILABLE

TABLE OF CONTENTS


| | | Page |
|---|---|---|
| 1.0 | INTRODUCTION | 1 |
| | 1.1 Purpose of Study | 1 |
| | 1.2 Authority and Acknowledgements | 1 |
| | 1.3 Coordination | 1 |
| 2.0 | AREA STUDIED | 2 |
| | 2.1 Scope of Study | 2 |
| | 2.2 Community Description | 4 |
| | 2.3 Principal Flood Problems | 4 |
| | 2.4 Flood Protection Measures | 6 |
| 3.0 | ENGINEERING METHODS | 8 |
| | 3.1 Hydrologic Analyses | 8 |
| | 3.2 Hydraulic Analyses | 11 |
| 4.0 | FLOOD PLAIN MANAGEMENT APPLICATIONS | 13 |
| | 4.1 Flood Boundaries | 13 |
| | 4.2 Floodways | 15 |
| 5.0 | INSURANCE APPLICATION | 15 |
| | 5.1 Reach Determinations | 15 |
| | 5.2 Flood Hazard Factors | 16 |
| | 5.3 Flood Insurance Zones | 16 |
| | 5.4 Flood Insurance Rate Map Description | 19 |




BEST COPY AVAILABLE

TABLE OF CONTENTS - continued


| | Page |
|---|---|
| 6.0 OTHER STUDIES | 19 |
| 7.0 LOCATION OF DATA | 19 |
| 8.0 BIBLIOGRAPHY AND REFERENCES | 19 |


FIGURES


| | |
|---|---|
| Figure 1 - Vicinity Map | 3 |
| Figure 2 - Photograph of Damage Caused by Hurricane Carol in August 1954 | 7 |
| Figure 3 - Transect Location Map | 14 |


TABLES


| | |
|---|---|
| Table 1 - High-Water Mark Elevations | 5 - 6 |
| Table 2 - Summary of Discharges | 9 |
| Table 3 - Summary of Stillwater Elevations | 10 |
| Table 4A - Flood Insurance Zone Data | 17 |
| Table 4B - Flood Insurance Zone Data | 18 |


EXHIBITS


| | |
|---|---|
| Exhibit 1 - Flood Profiles | |
| Jamestown Brook | Panels 01P-02P |
| Sheffield Cove Brook | Panels 03P-04P |
| Conanicut Brook | Panels 05P-06P |
| Beacon Avenue Tributary | Panels 07P-08P |
| Exhibit 2 - Coastal Profiles | |
| Transects 1-23 | Panels 01C-23C |
| Exhibit 3 - Flood Insurance Rate Map Index | |
| Flood Insurance Rate Map | |




BEST COPY AVAILABLE

FLOOD INSURANCE STUDY
TOWN OF JAMESTOWN, RHODE ISLAND

## 1.0 INTRODUCTION

### 1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Jamestown, Newport County, Rhode Island, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

### 1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses performed by the Soil Conservation Service for the Federal Emergency Management Agency (FEMA). The updated version was prepared by Stone & Webster Engineering Corporation for FEMA, under Contract No. EMW-C-0405. This work was completed in February 1984.

### 1.3 Coordination

On September 5, 1979, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the Town of Jamestown, and Stone & Webster Engineering Corporation (the study contractor). At this meeting, areas to be studied in detail and general background information on flooding and potential development were obtained from the town engineer. Upon initiation of the study, the Newport Daily News ran an announcement of intent to perform the Flood Insurance Study.



BEST COPY AVAILABLE

During the course of the study, general community information as well as information on past flooding in Jamestown was requested (and obtained when available) from town officials, private citizens, the Providence Journal, the Rhode Island Department of Economic Development, the University of Rhode Island Coastal Resource Management Center, the Rhode Island Department of Environmental Management, and the Soil Conservation Service (SCS). The U. S. Army Corps of Engineers (COE), FEMA, and PRC Harris, Inc., were contacted for data concerning coastal flood elevations. A street map of the town was obtained from Island Engineering. Coordination with interested parties was maintained throughout the course of the study.

On March 8, 1984, the preliminary results of the study were presented to the town by the study contractor at an intermediate CCO meeting. On December 21, 1984, the results of the study were reviewed at a final CCO meeting attended by representatives of FEMA, the town, and the study contractor.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Jamestown, Newport County, Rhode Island. The area of study is shown on the Vicinity Map (Figure 1).

Riverine flooding on Jamestown Brook from the Lower Jamestown Reservoir Dam to the upstream side of Eldred Avenue, Sheffield Cove Brook from its mouth to the upstream side of Narragansett Avenue, Conanicut Brook from its mouth to the downstream side of North Main Road, and Beacon Avenue Tributary from its mouth to the downstream side of Spirketing Street was studied by detailed methods. Tidal flooding including its wave action from Rhode Island Sound and Narragansett Bay was also studied by detailed methods. Great Creek, Round Swamp, and Fox Hill Pond were included as part of the detailed tidal analysis. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through February 1989.

An unnamed swamp and the remaining portions of Jamestown Brook and Beacon Avenue Tributary were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Jamestown.



BEST COPY AVAILABLE

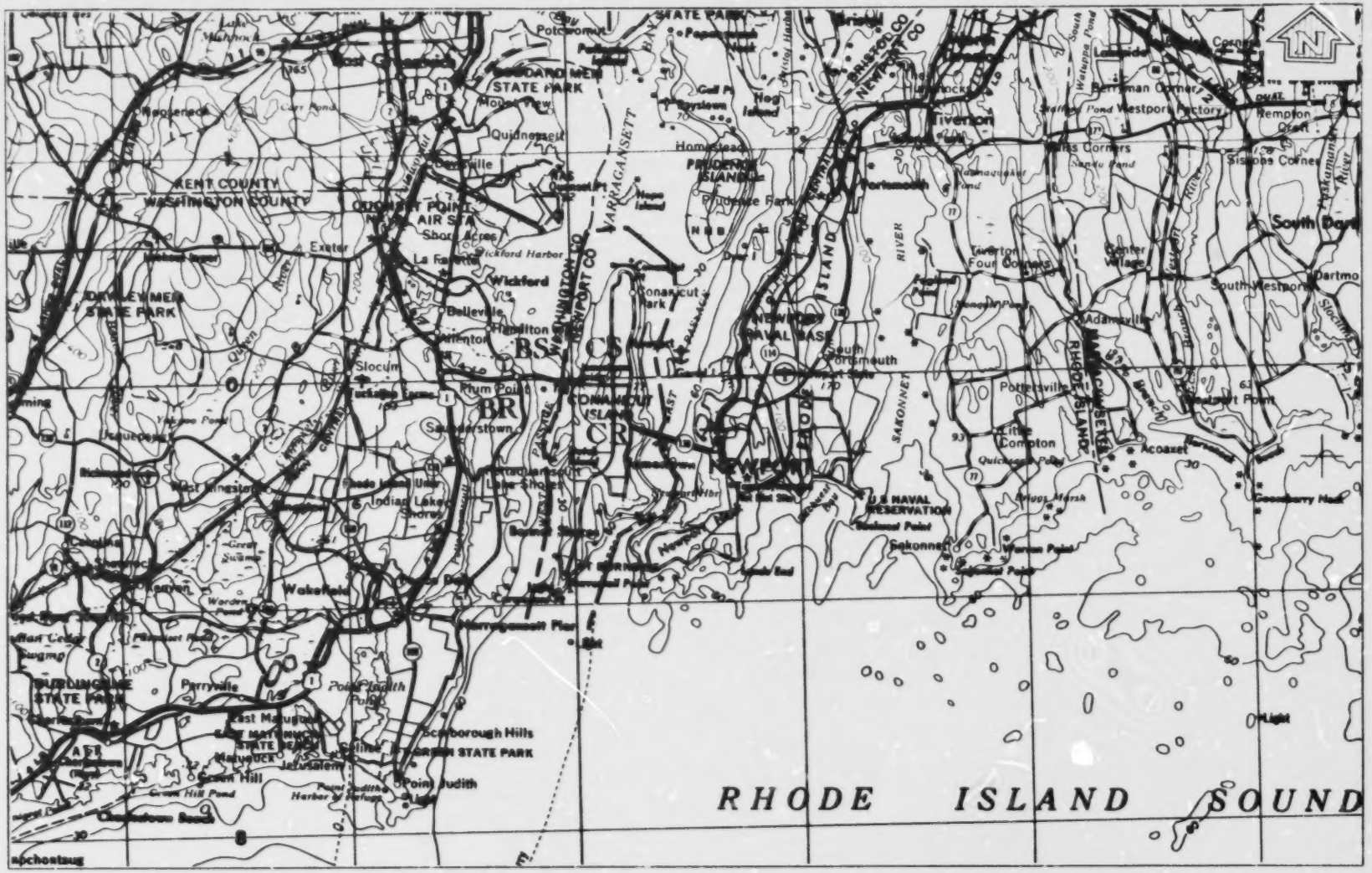



FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

## TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

## VICINITY MAP

BEST COPY AVAILABLE

## 2.2 Community Description

The Town of Jamestown is located in the southwestern portion of Newport County in southeastern Rhode Island, approximately 26 miles south of the City of Providence. Jamestown is an island situated at the entrance to Narragansett Bay. It is bordered by the Towns of Narragansett and North Kingstown to the west, the Town of Portsmouth to the north, the Town of Middletown and the City of Newport to the east, and Rhode Island Sound to the south.

Jamestown encompasses a land area of 9.7 square miles and a water area of 21.8 square miles. The island has a length of approximately 8.7 miles along its major north-south axis and is approximately 1.6 miles wide at its widest point. A ridge formed along its major axis rises to an elevation of 140 feet from which the land slopes to the coast.

There are ten fairly distinct drainage areas on the island, the largest being Jamestown Brook, which has a drainage area of approximately 1.1 square miles. The other drainage systems vary in size from 0.8 square mile to 0.1 square mile; most have drainage areas of less than 0.3 square mile.

Jamestown is an ocean resort and residential community with the majority of residents employed outside the town, particularly in the North Kingstown area. The population of Jamestown was 4,040 in 1980, a 39-percent increase from 2,911 in 1970 (Reference 1). The population density rose during this period from 300 persons per square mile to 416 persons per square mile.

The climate of the town is variable. The average annual precipitation is approximately 39 inches. Mean temperatures for January and July are approximately 30 degrees Fahrenheit (°F) and 71°F, respectively (References 2 and 3).

## 2.3 Principal Flood Problems

Flooding in Jamestown is generally limited to the coastal lowlands along Narragansett Bay. The most severe coastal flooding occurs during hurricanes, which are tropical in nature and are characterized by low barometric pressures, wind speeds greater than or equal to 75 miles per hour, torrential rain, tremendous waves, and tidal flooding. Severe coastal flooding resulted from the hurricanes of September 1938 and August 1954. Both of these storms had a severe effect on portions of the coastline of Jamestown. Along the coast of the town, the recurrence intervals for the 1938 and 1954 hurricanes were estimated to be approximately 100 years and 70 years, respectively. High-water marks for the 1938 and 1954 hurricanes in the area around Jamestown are shown in Table 1 (Reference 4, 5, 6, 7, 8, 9, and 10).



BEST COPY AVAILABLE

## Table 1 - High-Water Mark Elevations

| LOCATION | HURRICANE September 21, 1938 (feet) | HURRICANE CAROL August 31, 1954 (feet) |
|---|---|---|
| **Narragansett Bay** | | |
| Newport | | |
| Bailey Beach | 13.5 | -- |
| Price Neck | 15.0 | 11.0 |
| Brenton Point | 19.9,18.6 | -- |
| Newport Harbor | 11.4 | -- |
| USC&GS Tidal Gage | 12.8 | 9.8 |
| Middletown | | |
| Coddington Cove | -- | 10.5 |
| Portsmouth | | |
| South End | | |
| Providence Island | 12.3 | 11.0 |
| Melville | 12.4 | 11.4 |
| Homestead | 14.2 | 12.0 |
| Bristol | | |
| Bristol Point | -- | 11.0 |
| Bristol Harbor | 13.2,14.0 | 12.5,13.0 |
| Warren | | |
| Warren River Mouth | 14.6 | 13.2 |
| Barrington | | |
| Rumstick Neck | 15.1 | -- |
| Barrington Beach | 15.5 | 15.0 |
| Nayatt Point | 15.4 | 15.1 |
| Bullock Cove | 15.2 | 14.5 |
| East Providence | | |
| Bullock Point | 15.8 | 14.8 |
| Crescent Park | 16.1 | -- |
| Squantum Point | 15.9 | 16.2 |
| Providence | | |
| Seekonk River | 16.1 | 14.9 |
| Point St. Bridge | 16.6 | 15.3 |
| USC&GS Tide Gage | 15.8 | 14.8 |



BEST COPY AVAILABLE

Table 1 - High-Water Mark Elevations - continued

| LOCATION | HURRICANE September 21, 1938 (feet) | HURRICANE CAROL August 31, 1954 (feet) |
|---|---|---|
| Sakonnet River | | |
| Little Compton | | |
| Breakwater Point | 13.8 | 10.7 |
| Portsmouth | | |
| Sandy Point | -- | 11.8 |
| McCurry Point | -- | 11.3 |
| Island Park | 15.3 | 14.4 |
| Railroad Bridge | 15.6 | -- |
| Common Fence Point | 14.2 | 12.0 |
| Warren River | | |
| Laurel Park | -- | 14.0 |
| Kickamuit River | 13.2 | 13.5 |
| Fall River | | |
| USC&GS Tide Gage | 13.8 | 13.4 |

Due to the limited drainage pattern, inland flooding has not been as much of a problem as coastal flooding on the island to date. The most serious problems have occurred where recently built subdivisions have encroached upon flood plains and wetland areas. No published reports of damage in the riverine areas studied by detailed methods were found.

Figure 2 is a photograph of damage to the old ferry dock at the east end of Narragansett Avenue following Hurricane Carol in August 1954.

## 2.4 Flood Protection Measures

Existing flood protection along most of the coast of Jamestown is offered by the natural, steep, rocky shoreline. The high cliffs are especially predominant along the southern coast where the major protection is necessary. Wind and wave activity along the Jamestown shoreline in Narragansett Bay is somewhat limited by the open water fetch. In low-lying areas, existing flood protection is limited to a few seawalls and some scattered areas of dumped rip-rap.

There are no flood control structures affecting streamflow in Jamestown. The two dams on Jamestown Brook are used for water supply and offer only indirect flood control.



BEST COPY AVAILABLE

Figure 2 - View of the ferry dock and waiting room at the east end of Narragansett Avenue in Jamestown after Hurricane Carol, August 31, 1954. (Providence Journal Photograph)

BEST COPY AVAILABLE

## 3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for the flooding sources studied in detail affecting the community.

Peak discharges for the riverine streams studied by detailed methods were computed by the SCS in the original Flood Insurance Study for Jamestown (Reference 2). The discharges were determined using the relationship between time of concentration and flow in cubic feet per second per square mile per inch of runoff. Time of concentration for each drainage basin was calculated from the physical characteristics of the basin. Flow was calculated using rainfall data for the area and SCS runoff curves (curve number used based on soils and land-use data for each basin) (Reference 11).

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 2, "Summary of Discharges."

Tidal elevation-frequency relationships for the areas surrounding Jamestown were determined by analyzing the tide gage records and historic high-water mark data for Narragansett Bay and Rhode Island Sound (References 7, 8, 9, and 10). Tide gages were placed by the National Oceanic and Atmospheric Administration at Newport and Providence. At points where reliable high-water mark records were available, stage



BEST COPY AVAILABLE

TABLE 2 - SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|---|
| JAMESTOWN BROOK | | | | | |
| At the mouth | 1.1 | 451 | 724 | 919 | 1,319 |
| SHEFFIELD COVE BROOK | | | | | |
| At the mouth | * | 264 | 434 | 496 | 639 |
| CONANICUT BROOK | | | | | |
| At the mouth | * | 106 | 164 | 222 | 295 |
| BEACON AVENUE TRIBUTARY | | | | | |
| At the mouth | * | 69 | 114 | 136 | 216 |

*Data not available - drainage area less than one square mile

correlation analyses were performed to develop frequency curves at these points. Analyses for both the tide gage data and high-water mark records were used to develop profiles of stillwater elevations selected for recurrence intervals on Narragansett Bay and Rhode Island Sound.

For the Providence tidal gage, the elevation-frequency relationship established by the COE in 1964 was used. A stage-frequency relationship established at Fall River by the COE was also utilized. The Newport tidal gage elevation-frequency curve was revised from the COE 1964 analysis because the curve used an elevation of 10.8 feet for the 1938 hurricane rather than the recorded 12.5 feet. High-water marks at Narragansett Pier were used to formulate a stage-frequency relationship at Narragansett Pier based on the revised elevation-frequency curve at Newport. Thus, stillwater elevations along the Jamestown shoreline were interpolated from tidal elevation-frequency analyses available for Providence, Newport, and Narragansett Pier, Rhode Island, and for Fall River, Massachusetts.

The stillwater elevations for the 10-, 50-, 100-, and 500-year floods have been determined for Rhode Island Sound and Narragansett Bay and are summarized in Table 3.

The analyses reported in this study reflect the stillwater elevations due to tidal and wind setup effects. The effects of wave action were also considered in the determination of flood hazard areas. Coastal structures that are located above stillwater flood elevations can still be severely damaged by wave runup, wave-induced erosion, and wave-borne debris. The extent of wave runup past stillwater levels depends greatly on the wave conditions and local topography.



BEST COPY AVAILABLE

TABLE 3 - SUMMARY OF STILLWATER ELEVATIONS

| FLOODING SOURCE AND LOCATION | ELEVATION (feet) 10-YEAR | 50-YEAR | 100-YEAR | 500-YEAR |
|---|---|---|---|---|
| RHODE ISLAND SOUND | | | | |
| Beavertail Point to the northern limits of the U. S. Naval Reservation (applies to east and west sides of island) | 7.7 | 11.6 | 13.5 | 17.8 |
| NARRAGANSETT BAY | | | | |
| Northern limits of U. S. Naval Reservation to southern limits of Austin Hollow (West Passage) and to southern limits of Hull Cove (East Passage) | 7.4 | 11.1 | 12.9 | 16.8 |
| Austin Hollow area (West Passage); Hull Cove area (East Passage) | 6.9 | 10.4 | 12.1 | 15.9 |
| Northern limits of Austin Hollow to northern end of Dutch Island Harbor (West Passage); northern limits of Hull Cove to Taylor Point (East Passage) | 6.7 | 10.0 | 11.6 | 15.4 |
| Northern limits of Dutch Island Harbor to Sinker Rock (West Passage); Taylor Point to Cranston Cove (East Passage) | 6.9 | 10.3 | 11.9 | 15.7 |
| Sinker Rock to Conanicut Point (West Passage); Cranston Cove to Conanicut Point (East Passage) | 7.4 | 10.8 | 12.4 | 16.2 |

Wave heights and corresponding wave crest elevations were determined using the National Academy of Sciences (NAS) methodology (Reference 12). The wave runup was determined using the methodology developed by Stone and Webster Engineering Corporation for FEMA (Reference 13).



BEST COPY AVAILABLE

## 3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the riverine sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

The hydraulic analyses for the riverine streams were obtained from the original Flood Insurance Study for Jamestown (Reference 2). Water-surface elevations were developed using a SCS backwater computer program.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the tidal flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The COE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (Reference 14). The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame or brick veneer structures.

A wave height analysis was performed to determine wave heights and corresponding wave crest elevations for the areas inundated by the tidal flooding. A wave runup analysis was performed to determine the height and extent of runup beyond the limit of tidal inundation. The results of these analyses were combined into a wave envelope, which was constructed by extending the maximum wave runup elevation seaward to its intersection with the wave crest profile.

The methodology for analyzing wave heights and corresponding wave crest elevations was developed by the NAS (Reference 12). The NAS methodology is based on three major concepts.

First, a storm surge on the open coast is accompanied by waves. The maximum height of these waves is related to the depth of water by the following equation:

$$H_b = 0.78d$$



BEST COPY AVAILABLE

where $H_b$ is the crest to trough height of the maximum or breaking wave and d is the stillwater depth. The elevation of the crest of an unimpeded wave is determined using the equation:

$$Z_w = S_* + 0.7H_* = S_* + 0.55d$$

where $Z_w$ is the wave crest elevation, $S_*$ is the stillwater elevation at the site, and $H_*$ is the wave height at the site. The 0.7 coefficient is the portion of the wave height which reaches above the stillwater elevation. $H_b$ is the upper limit for $H_*$.

The second major concept is that the breaking wave height may be diminished by dissipation of energy by natural or man-made obstructions. The wave height transmitted past a given obstruction is determined by the following equation:

$$H_t = BH_i$$

where $H_t$ is the transmitted wave height, $H_i$ is the incident wave height, and B is a transmission coefficient ranging from 0.0 to 1.0. The coefficient is a function of the physical characteristics of the obstruction. Equations have been developed by the NAS to determine B for vegetation, buildings, natural barriers such as dunes, and man-made barriers such as breakwaters and seawalls (Reference 12).

The third concept deals with unimpeded reaches between obstructions. New wave generation can result from wind action. This added energy is related to distance and mean depth over the unimpeded reach.

The methodology for analyzing wave runup was developed by Stone and Webster Engineering Corporation (Reference 11). The wave runup computer program operates using an ensemble of deepwater wave heights, $H_i$, the stillwater elevation, S*, a wave period, $T_s$, and beach slope, m. For Jamestown, wave heights range from 5 feet up to the significant wave height of 30 feet; the wave period equals 14 seconds.

These concepts and equations were used to compute wave envelope elevations associated with the 100-year storm surge. Accurate topographic, land-use, and land cover data are required for the coastal analyses. Maps of the study area, at a scale of 1:4,800 with a contour interval of 5 feet were used for the topographic data (Reference 15). The land-use and land cover data were obtained by field surveys.

Wave heights and wave runup were computed along transects which were located perpendicular to the average mean shoreline. The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent



BEST COPY AVAILABLE

conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, the transects were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects. Figure 3, "Transect Location Map," illustrates the location of the transects for the community.

Along each transect, wave envelope elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. Between transects, elevations were interpolated using the topographic maps, land-use and land cover data, and engineering judgment to determine the areal extent of flooding. The results of the calculations are accurate until local topography, vegetation, or cultural development within the community undergo any major changes. Selected beach transects with stillwater elevations for the 10- and 100-year recurrence intervals and wave envelope profiles for the 100-year recurrence interval are shown on the Coastal Profiles (Exhibit 2).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used are shown on the maps.

## 4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

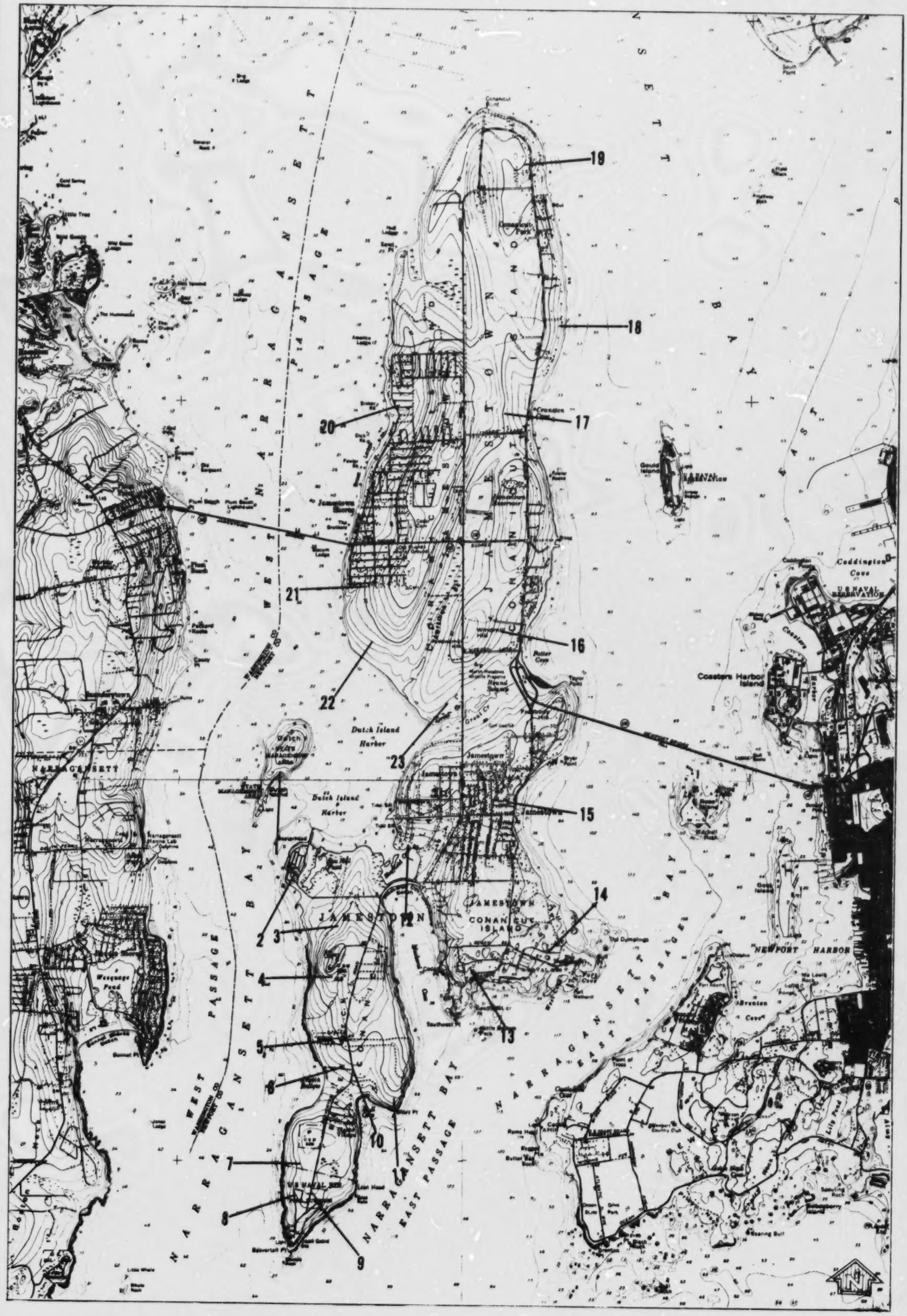
### 4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the riverine streams, the 100- and 500-year flood plain boundaries have been delineated using topographic maps (Reference 15).

For tidal areas without wave action, the 100-year and 500-year boundaries were delineated using the topographic maps referenced above (Reference 15). For the tidal areas with wave action, the flood boundaries were delineated using the elevations determined at each transect; between transects, the boundaries were interpolated using engineering judgment, land-cover data, and the topographic maps referenced above. The 100-year



BEST COPY AVAILABLE


19
18
17
20
21
16
22
23
15
14
13
12
2
3
4
5
6
7
8
9
10
JAMESTOWN
CONANICUT ISLAND
NARRAGANSETT
WEST PASSAGE
NARRAGANSETT BAY
EAST PASSAGE
Dutch Island Harbor
Coddington Cove
Coasters Harbor Island
NEWPORT HARBOR
Brenton Cove
Weaver's Pond
Lily Pond
Gooseberry Island
Beaver Tail Point
Conanicut Point
Jamestown
Dutch Island Harbor
Dutch Island Harbor
Beavertail Point
Beavertail Light
Rose Island
Rose Island Light
Goat Island
Castle Hill
Fort Adams
Newport
Brenton Point
Brenton Point State Park
Price Neck
Fort Wetherill
Fort Wetherill State Park
Jamestown Windmill
Watson Farm
Historical Society
Conanicut Island Sailing Club
Jamestown Boat Yard
Jamestown Marina
Mackerel Cove
Mackerel Cove Beach
Fort Getty
Fort Getty Recreation Area
Taylor Point
Taylor Point Marina
Bull Point
Bull Point Marina
Bull Point Beach
Bull Point Recreation Area
Dutch Island
Dutch Island Light
Potter Cove
Potter Cove Beach
Clingstone
Clingstone Beach
Clingstone Recreation Area
Fox Hill
Fox Hill Point
Fox Hill Beach
Fox Hill Recreation Area
Fox Hill Marina
Fox Hill Boat Yard
Fox Hill Boat Yard Beach
Fox Hill Boat Yard Recreation Area
Fox Hill Boat Yard Marina
Fox Hill Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Beach
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Recreation Area
Fox Hill Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Boat Yard Marina
Fox Hill Boat Yard

flood plain was divided into whole-foot elevation zones based on the average wave envelope elevation in that zone. Where the map scale did not permit these zones to be delineated at one foot intervals, larger increments were used.

For the areas studied by approximate methods, the boundary of the 100-year flood was delineated using USGS topographic maps (Reference 16).

The 100- and 500-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 3). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

### 4.2 Floodways

The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights.

No floodways were delineated for the streams in Jamestown, since there were no floodways in the original study for the town.

## 5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the Town of Jamestown.

### 5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

| Average Difference Between 10- and 100-Year Floods | Variation |
|---|---|
| Less than 2 feet | 0.5 foot |
| 2 to 7 feet | 1.0 foot |
| 7.1 to 12 feet | 2.0 feet |
| More than 12 feet | 3.0 feet |



BEST COPY AVAILABLE

The locations of the reaches determined for the riverine flooding sources of the Town of Jamestown are shown on the Flood Profiles (Exhibit 1) and summarized in Table 4A.

In areas where wave height and wave runup analyses were performed, reaches were determined for areas of the coastline, represented by a transect or group of transects, which have the same physical characteristics. For each transect the coastal high hazard zone (V zone) may be divided into two reaches to reflect those areas where wave runup is a dominant factor and those areas where wave runup does not dominate and elevations are determined by the wave height analysis. The reaches determined for the Town of Jamestown are summarized in Table 4B.

## 5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

## 5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

| | |
|---|---|
| Zone A: | Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined. |
| Zones A1, A3, A10, A11, A12, and A13: | Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs. |



BEST COPY AVAILABLE

| FLOODING SOURCE | PANEL[1] | ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND | | | FHF | ZONE | BASE FLOOD ELEVATION[3] (NGVD) |
|---|---|---|---|---|---|---|---|
| | | 10% (10 YR.) | 2% (50 YR.) | 0.2% (500 YR.) | | | |
| Jamestown Brook | | | | | | | |
| Reach 1 | 02 | -0.6 | -0.4 | +0.2 | 005 | A1 | Varies |
| Sheffield Cove Brook | | | | | | | |
| Reach 1 | 02 | -0.7 | -0.4 | +0.3 | 005 | A1 | Varies |
| Conanicut Brook | | | | | | | |
| Reach 1 | 01 | -0.4 | -0.2 | +0.2 | 005 | A1 | Varies |
| Beacon Avenue Tributary | | | | | | | |
| Reach 1 | 02 | -1.5 | -0.7 | +3.5 | 015 | A3 | Varies |
| Reach 2 | 02 | -0.2 | -0.1 | +0.7 | 005 | A1 | Varies |

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4 A

FEDERAL EMERGENCY MANAGEMENT AGENCY

**TOWN OF JAMESTOWN, R.I.**
(NEWPORT CO.)

**FLOOD INSURANCE ZONE DATA**

**JAMESTOWN BROOK, SHEFFIELD COVE BROOK, CONANICUT BROOK AND BEACON AVENUE TRIBUTARY**

BEST COPY AVAILABLE

TABLE 4B - FLOOD INSURANCE ZONE DATA

| Flooding Source | Stillwater Elevation 10-Year | Stillwater Elevation 100-Year | FHF | Zone | Base Flood Elevation (Feet NGVD)* |
|---|---|---|---|---|---|
| Rhode Island Sound | 7.7 | 13.5 | 060 | V12 | 27-33 |
| | | | 060 | A12 | 27-33 |
| Narragansett Bay | 7.4 | 12.9 | 055 | V11 | 25-35 |
| | | | 055 | A11 | 25-35 |
| | 6.9 | 12.1 | 050 | V10 | 14-35 |
| | | | 050 | A10 | 14-35 |
| | 6.7 | 11.6 | 050 | V10 | 14-39 |
| | | | 050 | A10 | 14-39 |
| | | | 075 | V15 | 14-17 |
| | | | 055 | A11 | 12-14 |
| | | | 060 | A12 | 12-14 |
| | 6.9 | 11.9 | 080 | V16 | 14-16 |
| | | | 060 | A12 | 12-14 |
| | | | 065 | A13 | 12-14 |
| | 7.4 | 12.4 | 080 | V16 | 14-17 |
| | | | 060 | A12 | 12-14 |

*Due to map scale limitations, base flood elevations shown on the FIRM represent average elevations for the zones depicted.

Zones V10, V11, V12, V15, and V16: Special Flood Hazard Areas along coasts inundated by the 100-year flood that have additional velocity hazards associated with waves of 3-foot amplitude or greater; with base flood elevations shown, and zones subdivided according to FHFs.

Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding; not subdivided.



BEST COPY AVAILABLE

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Tables 4A and 4B.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Jamestown is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

## 6.0 OTHER STUDIES

The flood levels presented in this study for the shoreline of Jamestown do not match information presented in coastal flood profiles developed for the area by the COE (Reference 17). The small discrepancies in predicted flood levels are due to the different analyses used in the two studies.

Flood Insurance Studies for the Towns of Narragansett, North Kingstown, Portsmouth, and Middletown and the City of Newport have been completed (References 18, 19, 20, 21, and 22). This study and those studies used the same analyses, however, due to the shoreline configuration and averaging of elevations, stillwater elevations do not match exactly between studies.

## 7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, Regional Director, Region I Office, J. W. McCormack Post Office and Courthouse Building, Room 462, Boston, Massachusetts 02109.

## 8.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Rhode Island, Washington, D. C., U. S. Government Printing Office, 1981.



BEST COPY AVAILABLE

2. U. S. Department of Housing and Urban Development, Federal Emergency Management Agency, Flood Insurance Study, Town of Jamestown, Newport County, Rhode Island, Washington, D. C., September 1971.

3. State of Rhode Island, Department of Economic Development, Town of Jamestown, Rhode Island Monograph, Providence, Rhode Island, April 1977.

4. The Providence Journal, "Hurricane Carol Lashes Rhode Island, August 31, 1954", Providence, Rhode Island, 1954.

5. The Providence Journal, "The Great Hurricane and Tidal Wave, Rhode Island, September 21, 1938", Providence, Rhode Island, 1938.

6. U. S. Army Corps of Engineers, New England Division, Narragansett Bay, Rhode Island, Hurricane Flood Levels, East Shore of Narragansett Bay, Waltham, Massachusetts, July 1964, Revised June 1979.

7. U. S. Army Corps of Engineers, New England Division, Hurricane Flood Levels, Narragansett Bay, Rhode Island, Sakonnet River, Mount Hope Bay, and Taunton River from Sakonnet Point, Rhode Island to Dighton, Massachusetts, Waltham, Massachusetts, July 1964, Revised June 1979.

8. U. S. Army Corps of Engineers, New England Division, Frequency of Tidal Flooding from Hurricanes and Storms at Providence, Rhode Island, Waltham, Massachusetts, August 1961, Revised June 1979.

9. U. S. Army Corps of Engineers, New England Division, Frequency of Tidal Flooding from Hurricanes and Storms at Newport, Rhode Island, Waltham, Massachusetts, July 1964, Revised June 1979.

10. U. S. Army Corps of Engineers, New England Division, Frequency of Tidal Flooding from Hurricanes and Storms at Fall River-Somerset, Massachusetts, Waltham, Massachusetts, July 1964, Revised June 1979.

11. U. S. Department of Commerce, Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D. C., 1961, Revised 1963.

12. National Academy of Sciences, Methodology for Calculating Wave Action Effects Associated with Storm Surges, Washington, D. C., 1977.

13. Stone and Webster Engineering Corporation, Manual for Wave Runup Analysis, Coastal Flood Insurance Studies, Boston, Massachusetts, November 1981.

14. U. S. Army Corps of Engineers, Galveston District, Guidelines for Identifying Coastal High Hazard Zones, Galveston, Texas, June 1975.



BEST COPY AVAILABLE

15. James W. Sewall Co., of Old Town, Maine, Topographic Maps compiled from aerial photographs, Scale 1:4,800, Contour Interval 5 Feet: Jamestown, Rhode Island, December 1980.

16. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Narragansett Pier, Rhode Island, 1957, Photorevised 1970 and 1975; Wickford, Rhode Island, 1957, Photorevised 1970 and 1975, Newport, Rhode Island, 1957, Photorevised 1970, Photoinspected 1975; Prudence Island, Rhode Island, 1975, Photorevised 1970 and 1975.

17. U. S. Army Corps of Engineers, New England Division, Tidal Flood Profiles, New England Coastline, Waltham, Massachusetts, January 1980.

18. Federal Emergency Management Agency, Flood Insurance Study, Town of Narragansett, Washington County, Rhode Island, Washington, D. C., July 26, 1984.

19. Federal Emergency Management Agency, Flood Insurance Study, Town of North Kingstown, Washington County, Rhode Island, Washington, D. C., August 16, 1982.

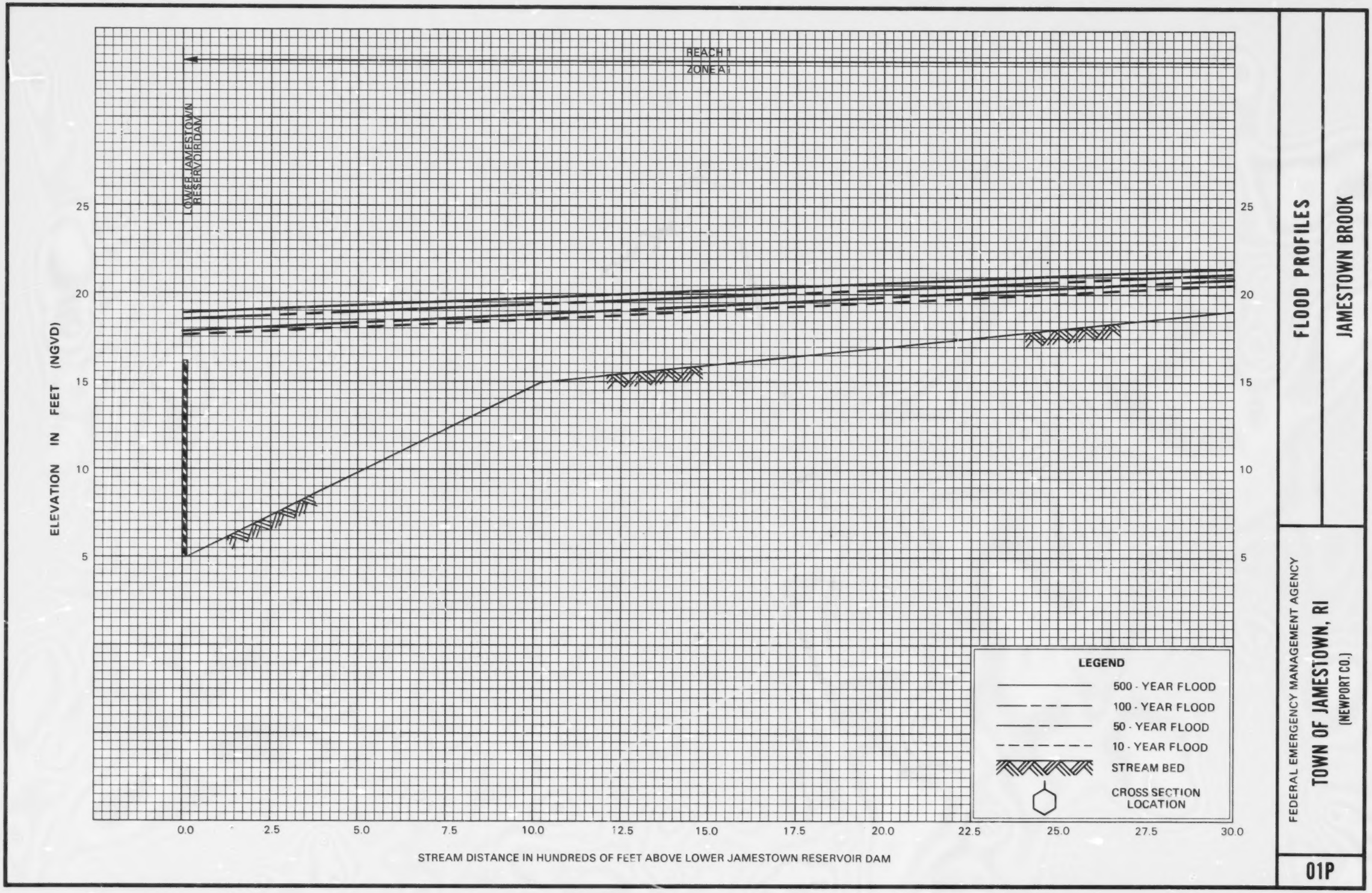
20. Federal Emergency Management Agency, Flood Insurance Study, Town of Portsmouth, Newport County, Rhode Island, Washington, D. C., September 2, 1982.

21. Federal Emergency Management Agency, Flood Insurance Study, Town of Middletown, Newport County, Rhode Island, Washington, D., C., October 17, 1984.

22. Federal Emergency Management Agency, Flood Insurance Study, City of Newport, Newport County, Rhode Island, Washington, D. C., August 2, 1982.



BEST COPY AVAILABLE




FLOOD PROFILES

JAMESTOWN BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

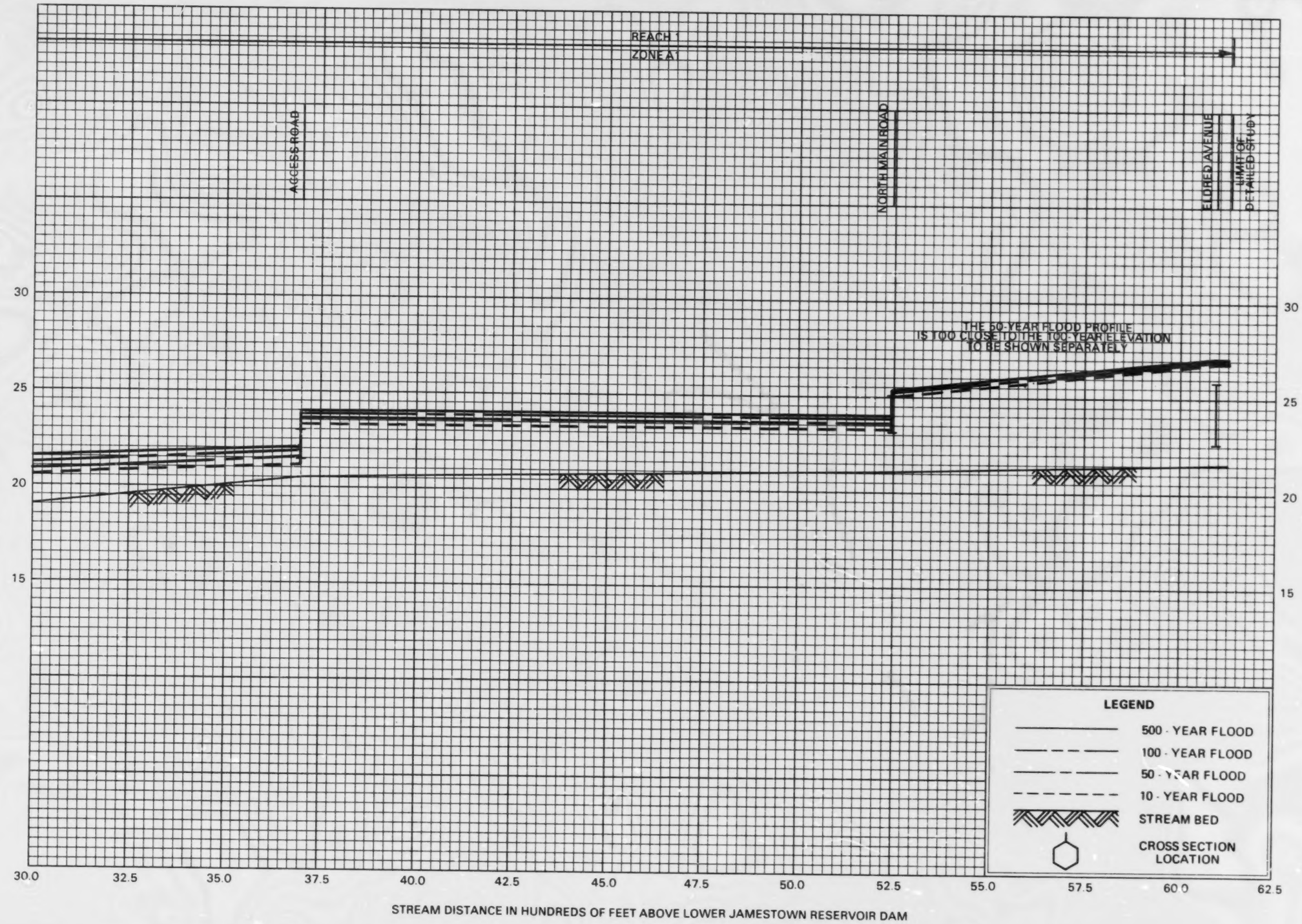
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

01P



BEST COPY AVAILABLE




FLOOD PROFILES

JAMESTOWN BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

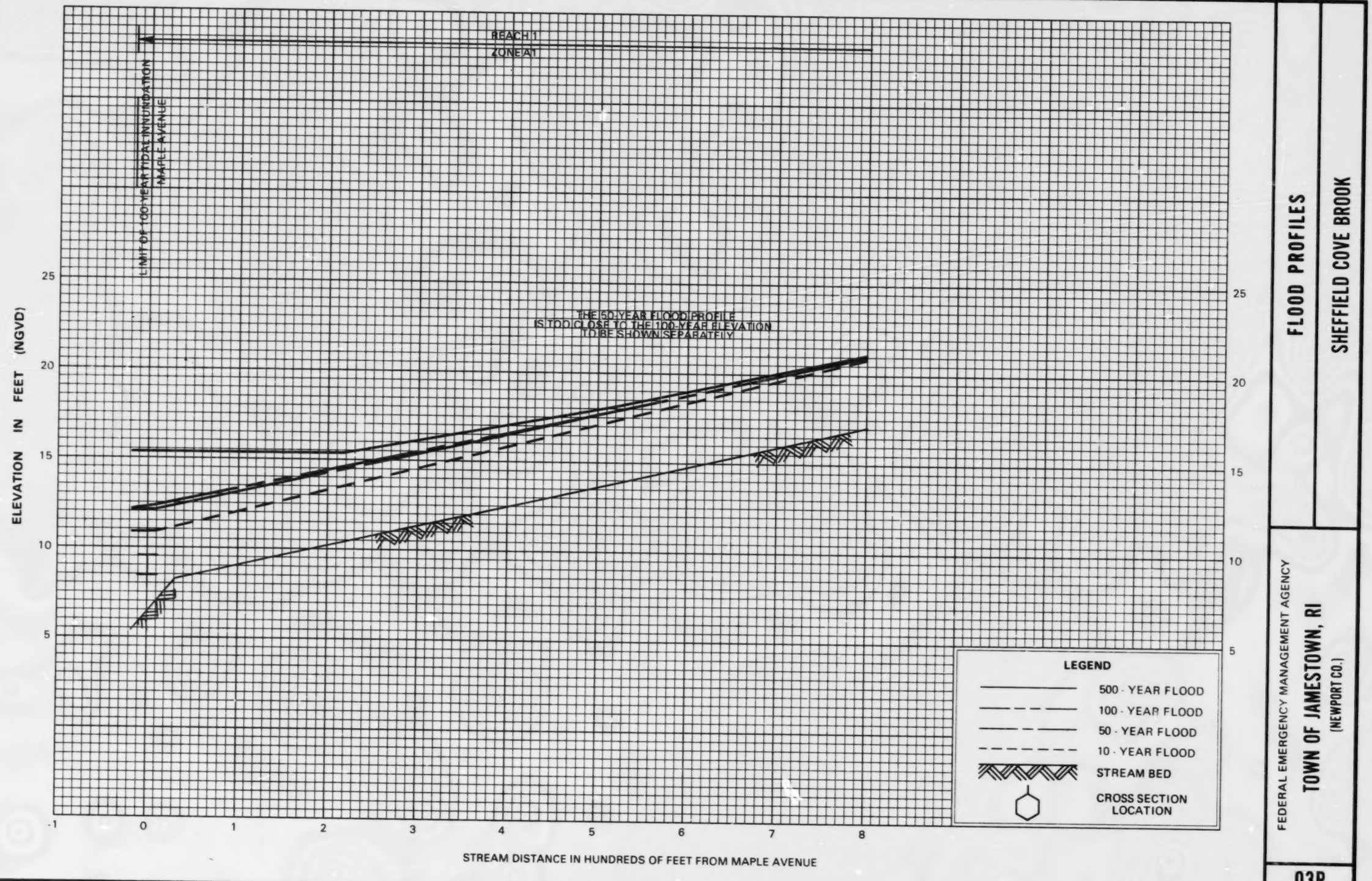
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

02P



BEST COPY AVAILABLE




FLOOD PROFILES

SHEFFIELD COVE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

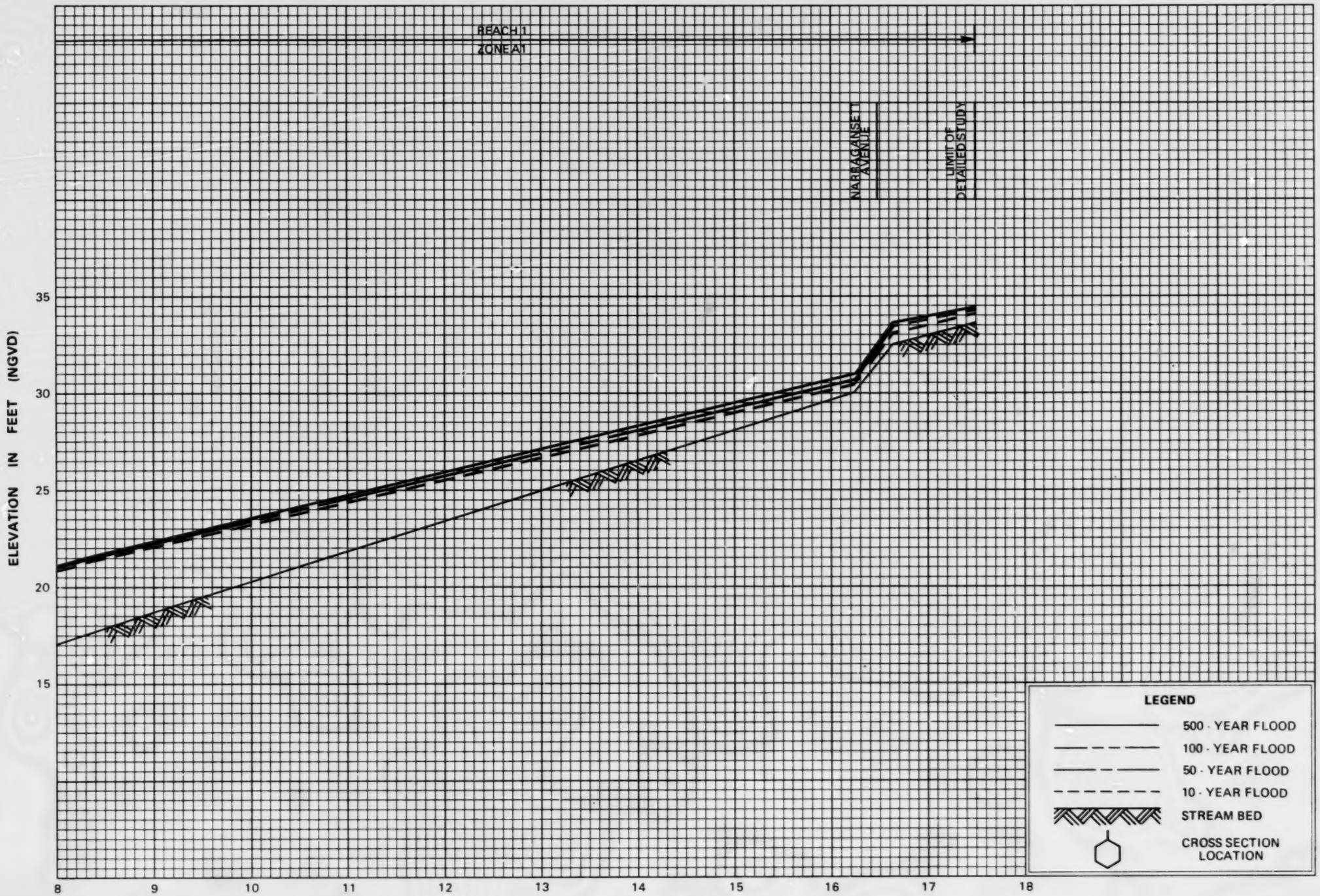
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

03P



BEST COPY AVAILABLE




FLOOD PROFILES

SHEFFIELD COVE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

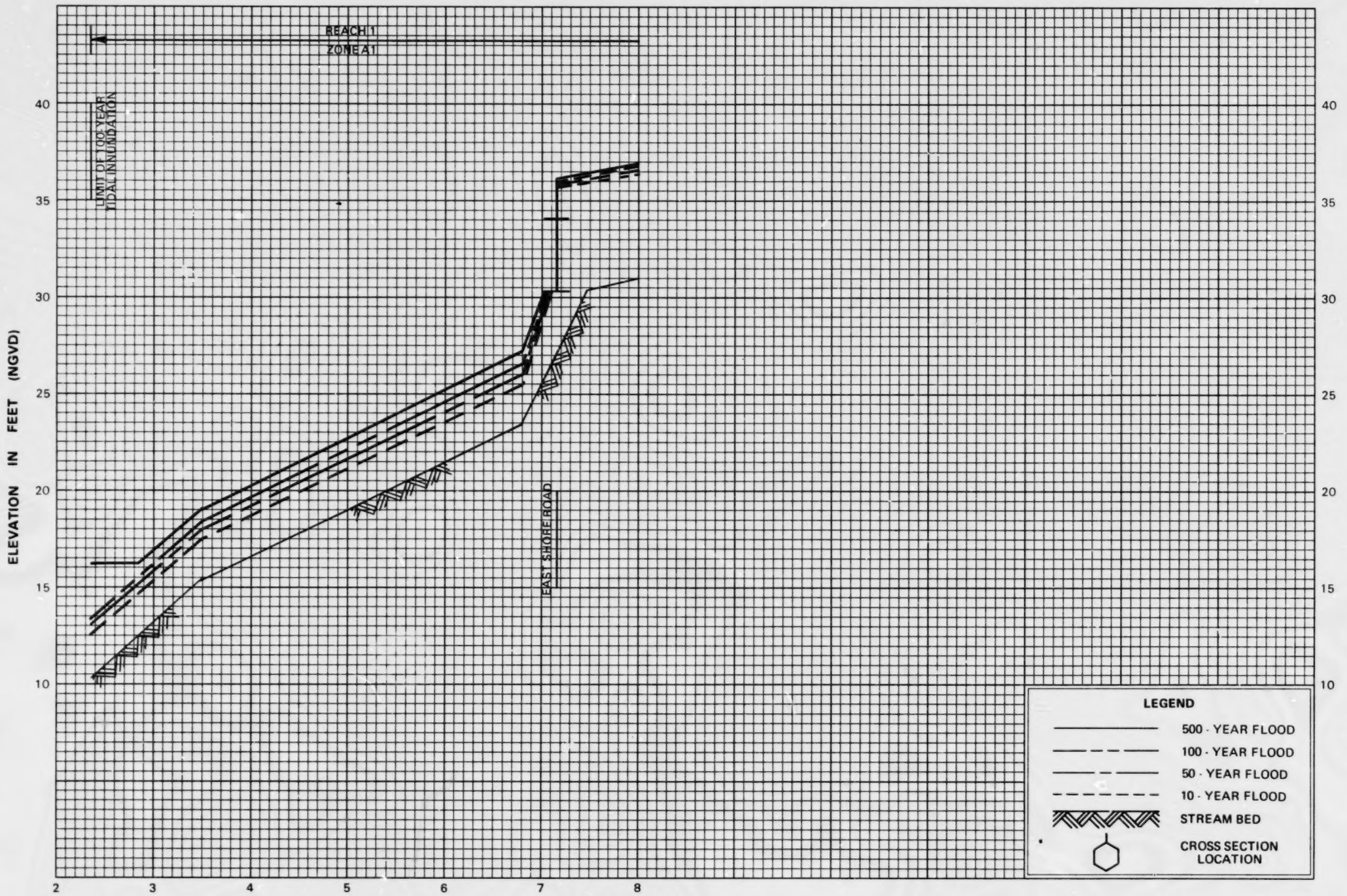
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

04P



BEST COPY AVAILABLE




FLOOD PROFILES

CONANICUT BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

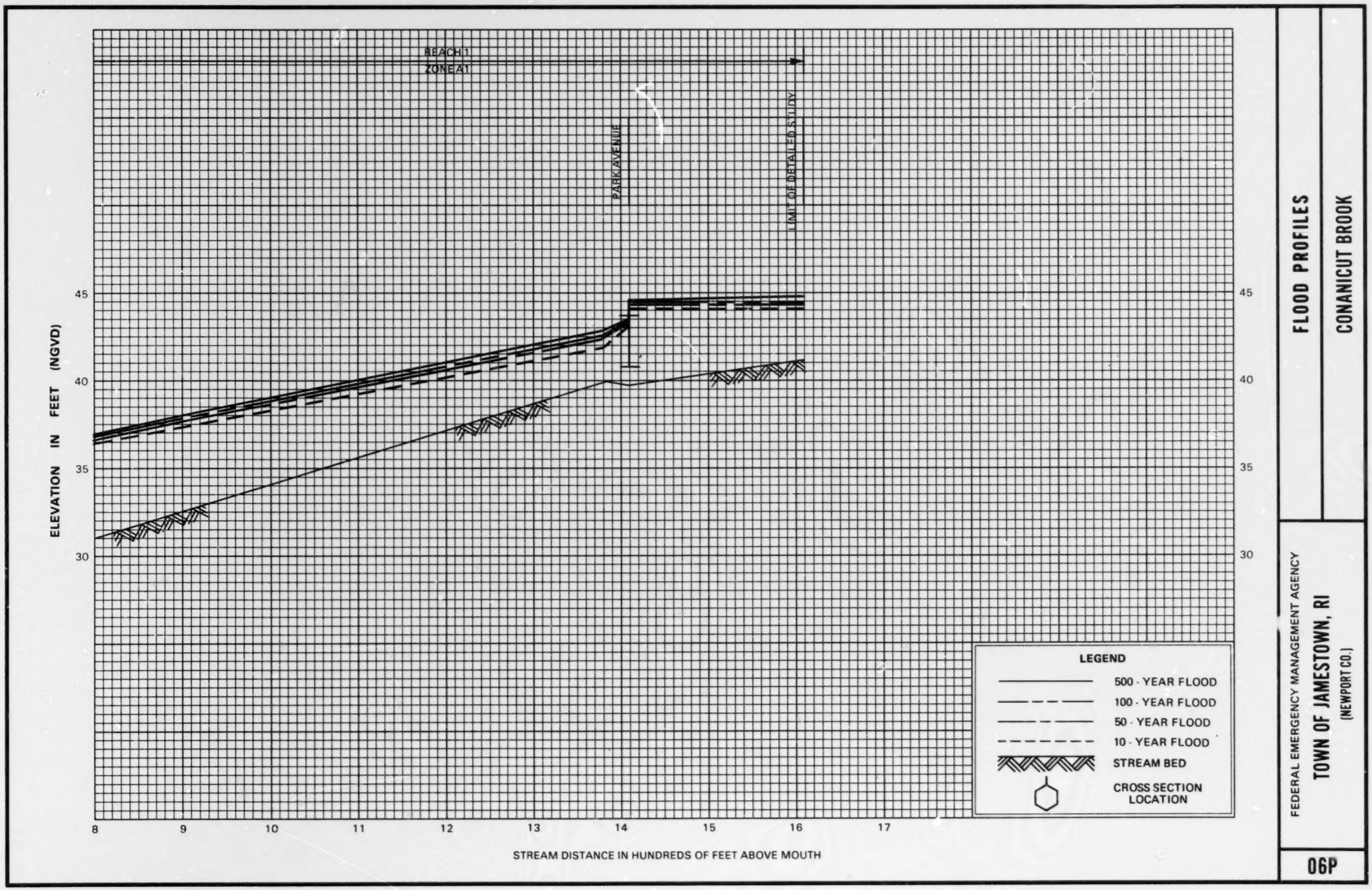
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

05P



BEST COPY AVAILABLE




FLOOD PROFILES

CONANICUT BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

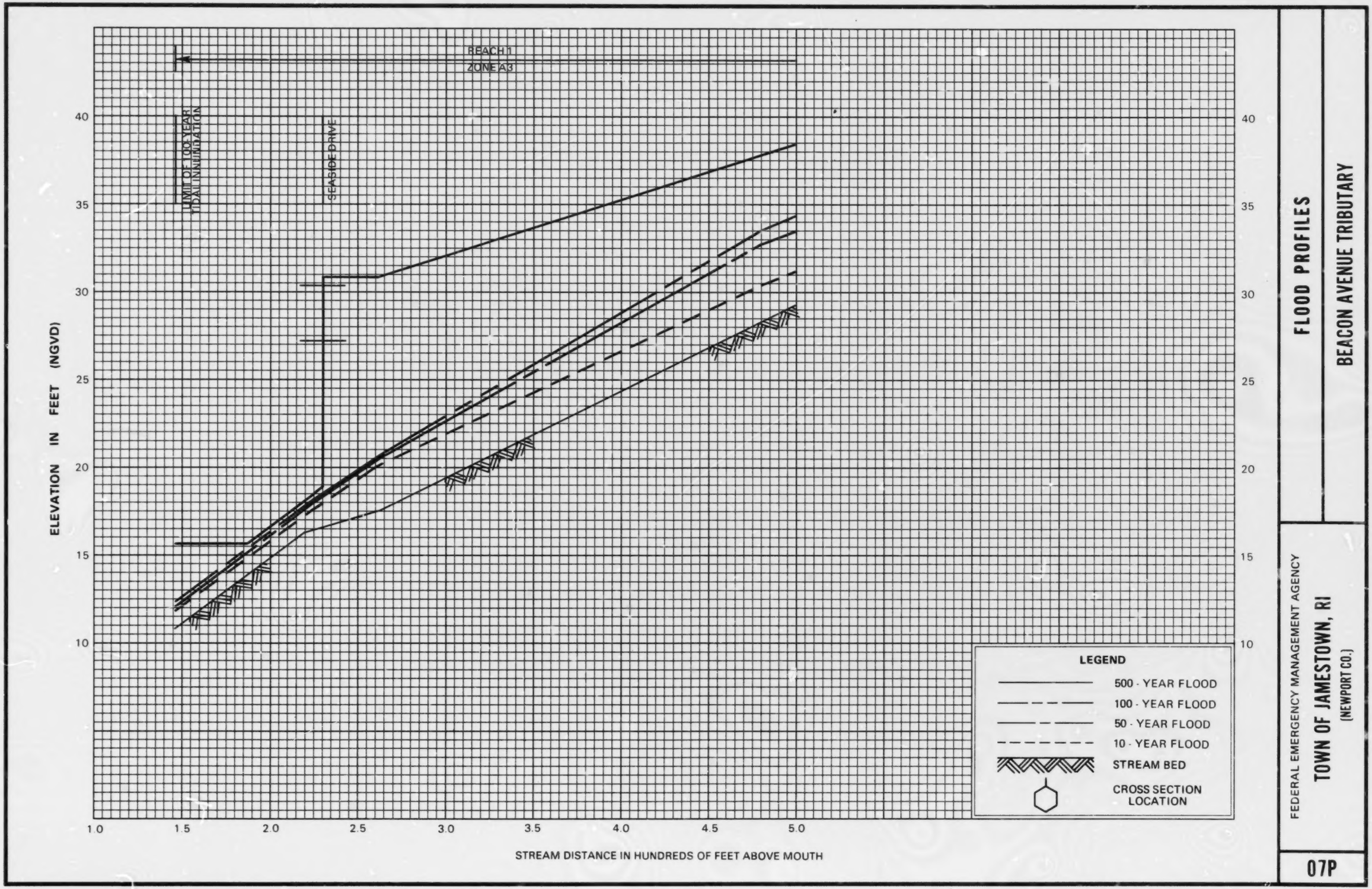
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

06P



BEST COPY AVAILABLE




FLOOD PROFILES

BEACON AVENUE TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

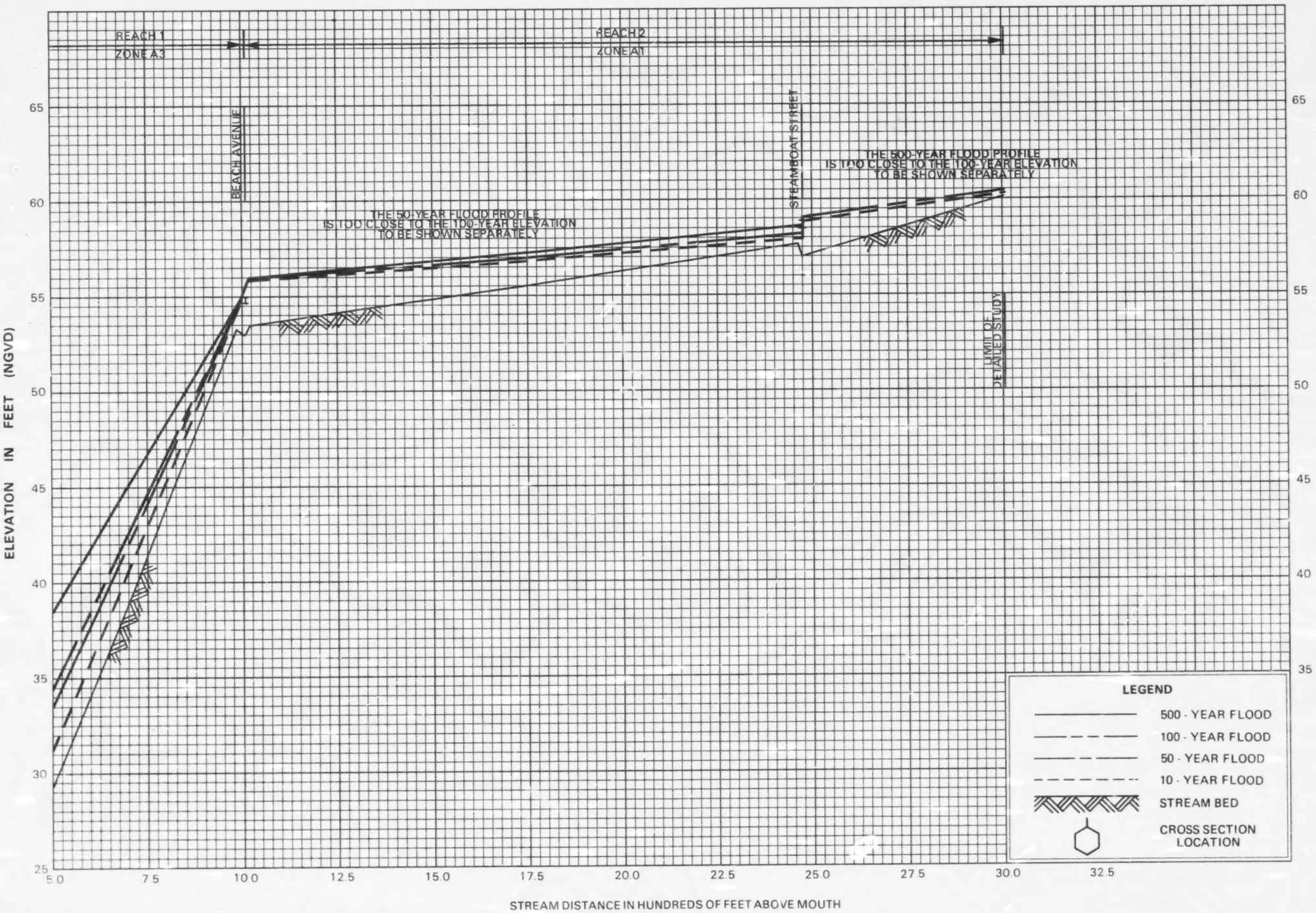
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

07P



BEST COPY AVAILABLE




FLOOD PROFILES

BEACON AVENUE TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

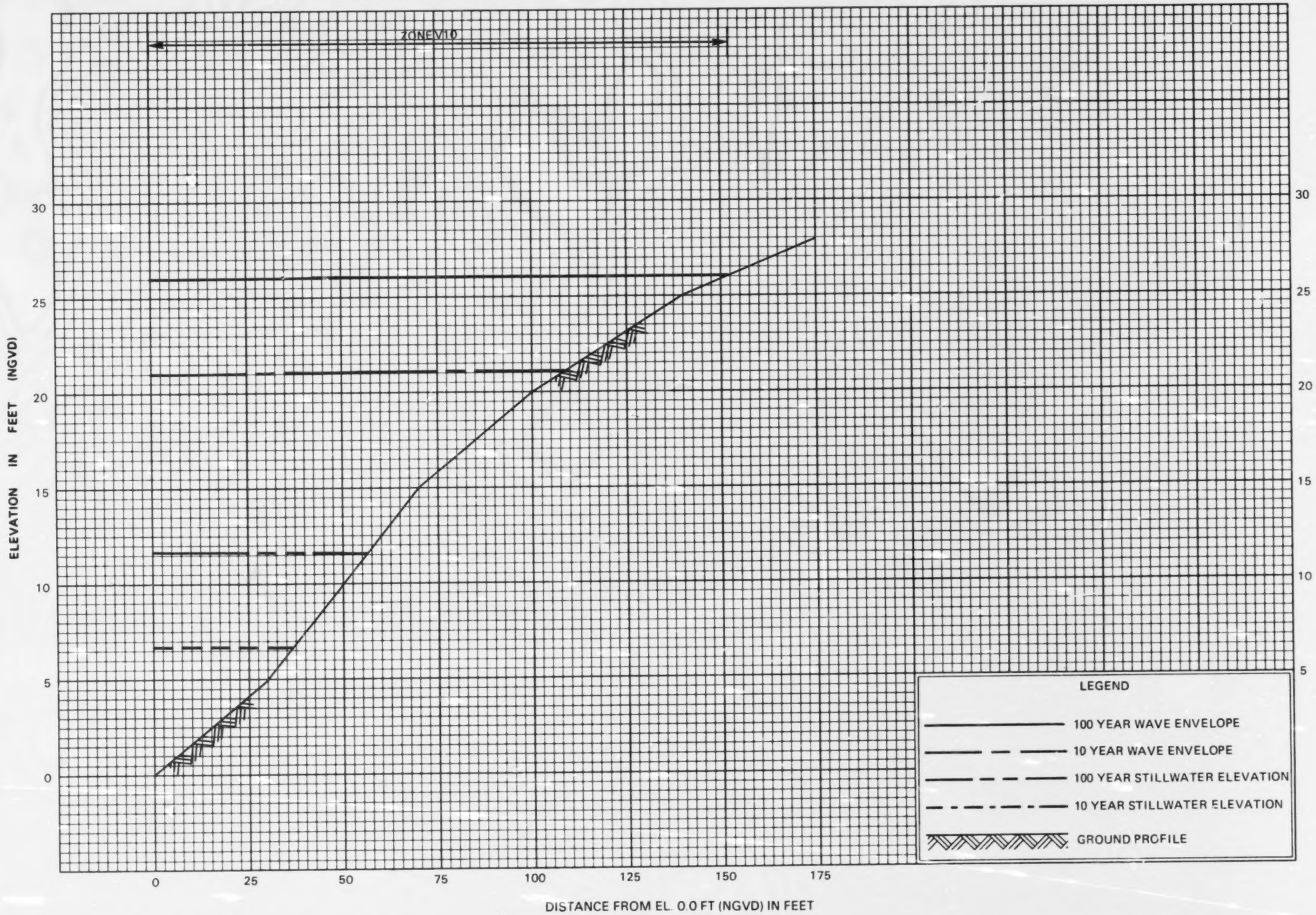
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

08P



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

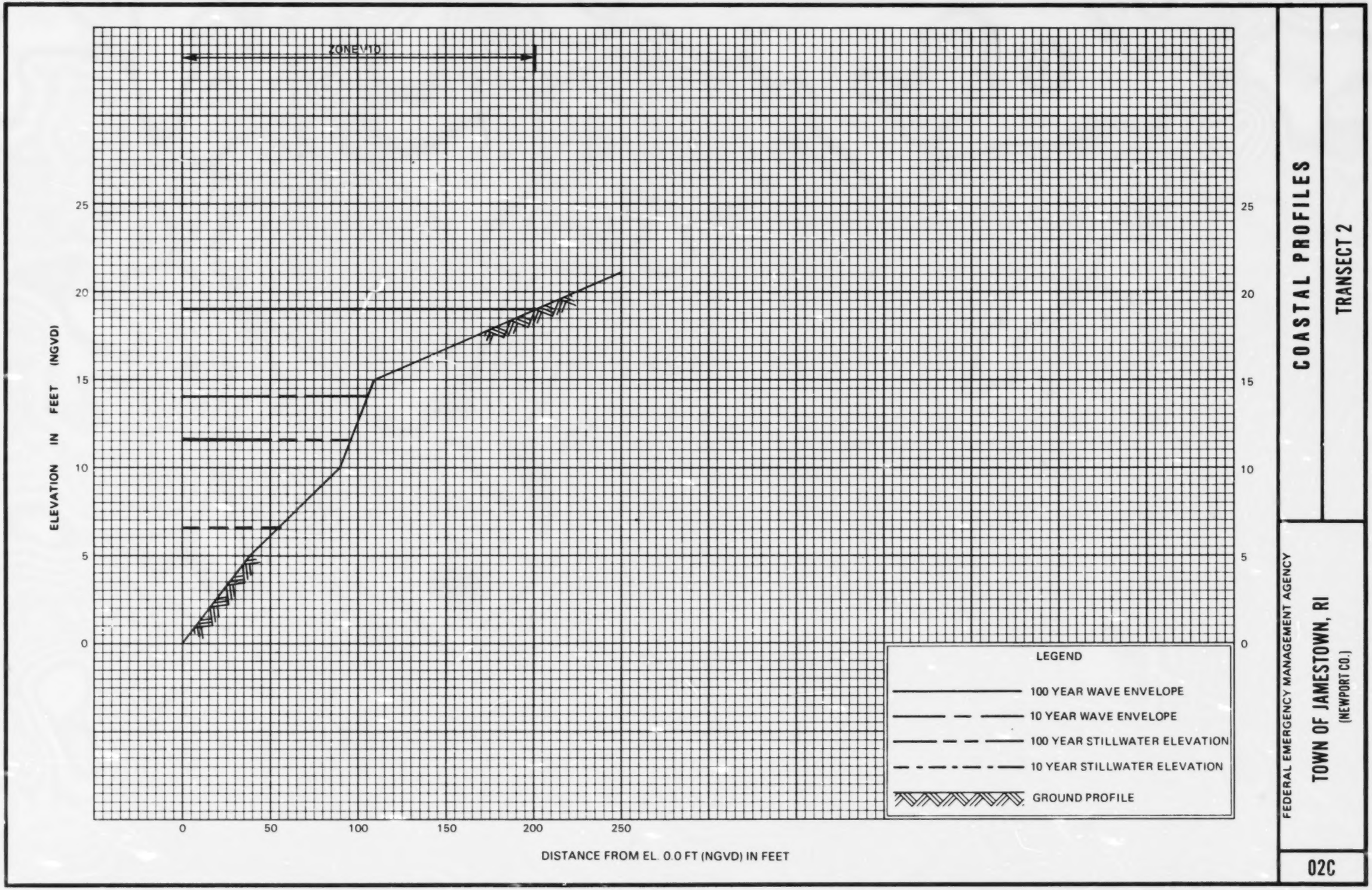
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

01C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

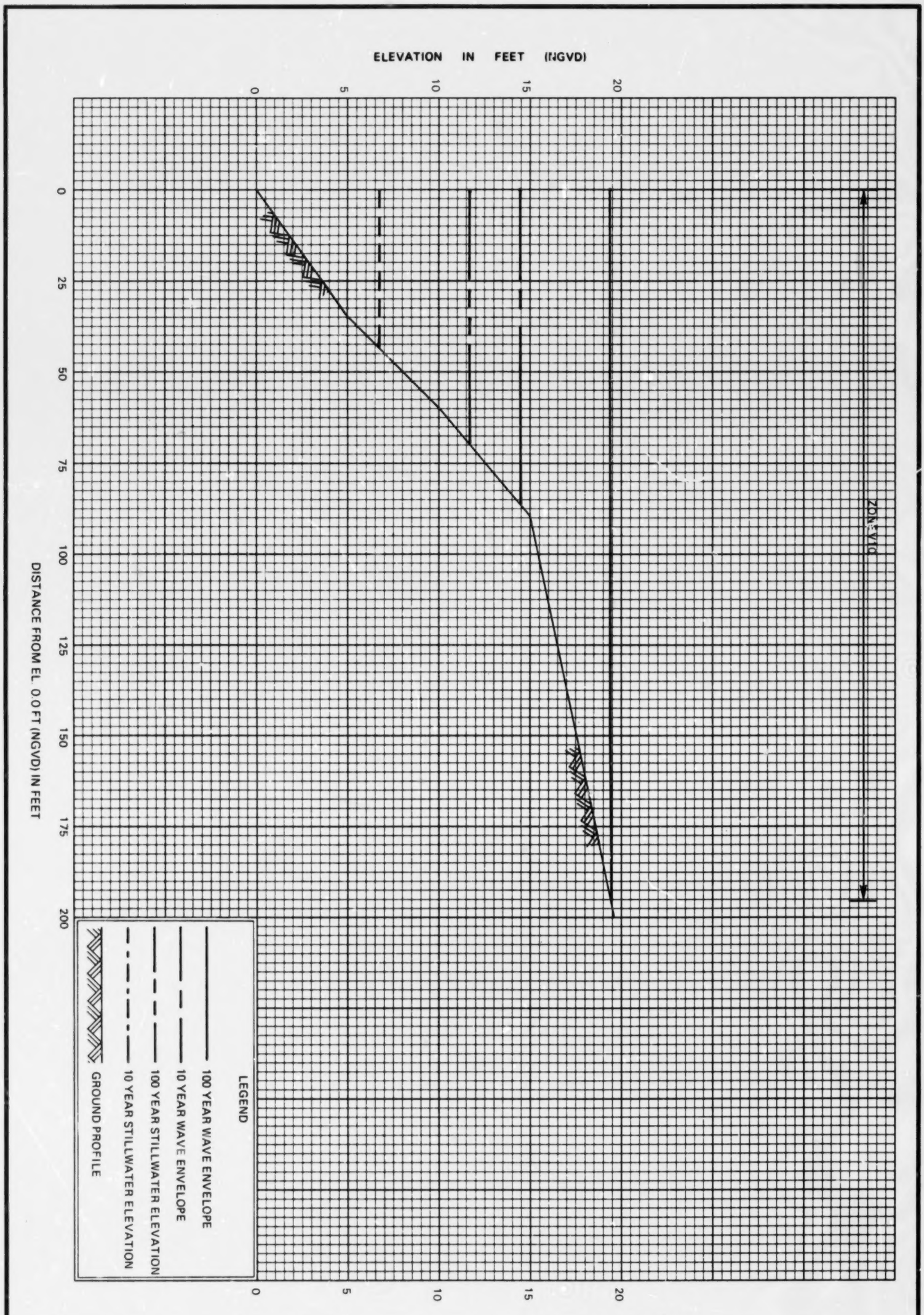
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

02C



BEST COPY AVAILABLE




FEDERAL EMERGENCY MANAGEMENT AGENCY

**TOWN OF JAMESTOWN, RI**

(NEWPORT CO.)

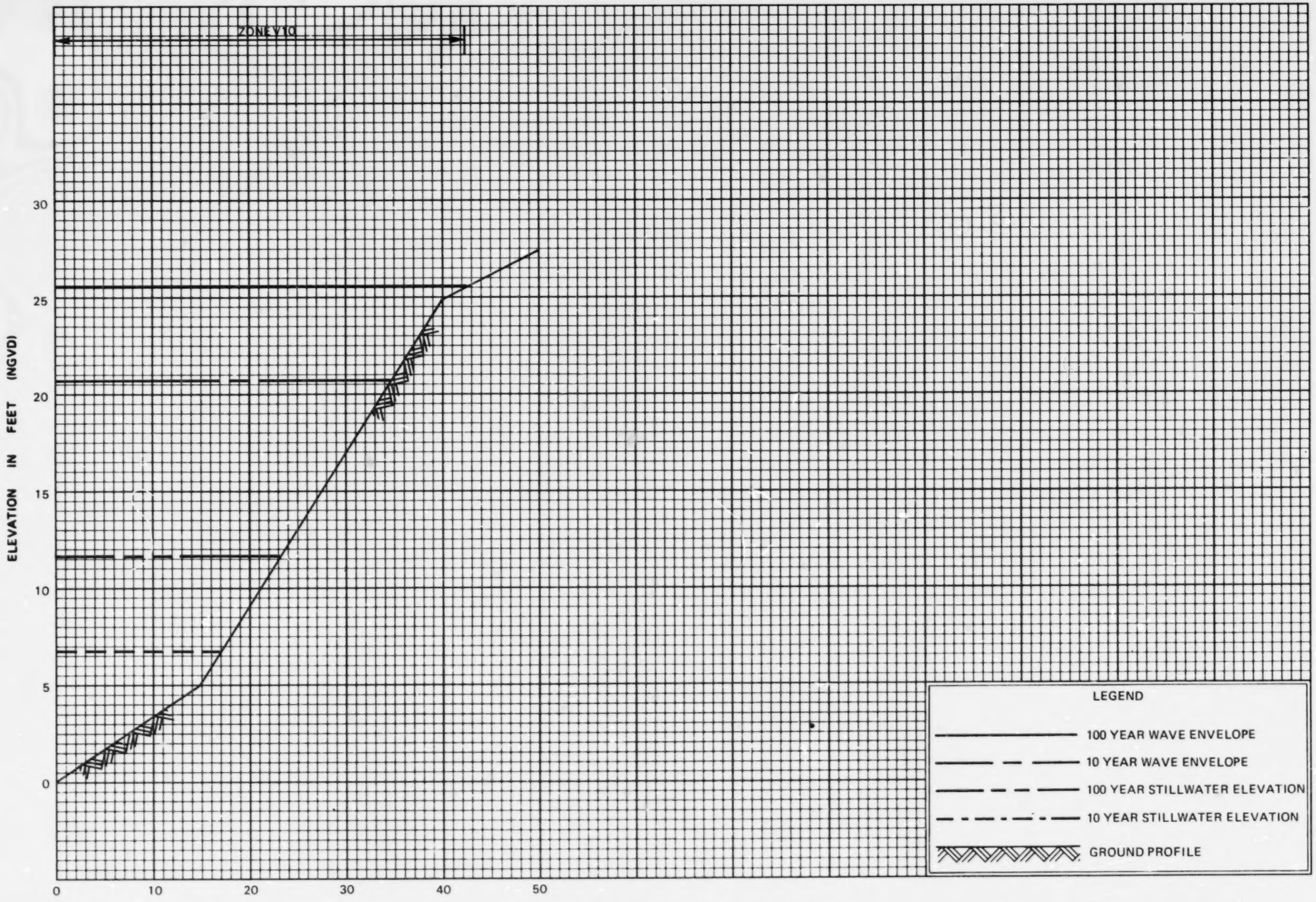
**COASTAL PROFILES**

**TRANSECT 3**

03C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

04C



BEST COPY AVAILABLE

COASTAL PROFILES

TRANSECT 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

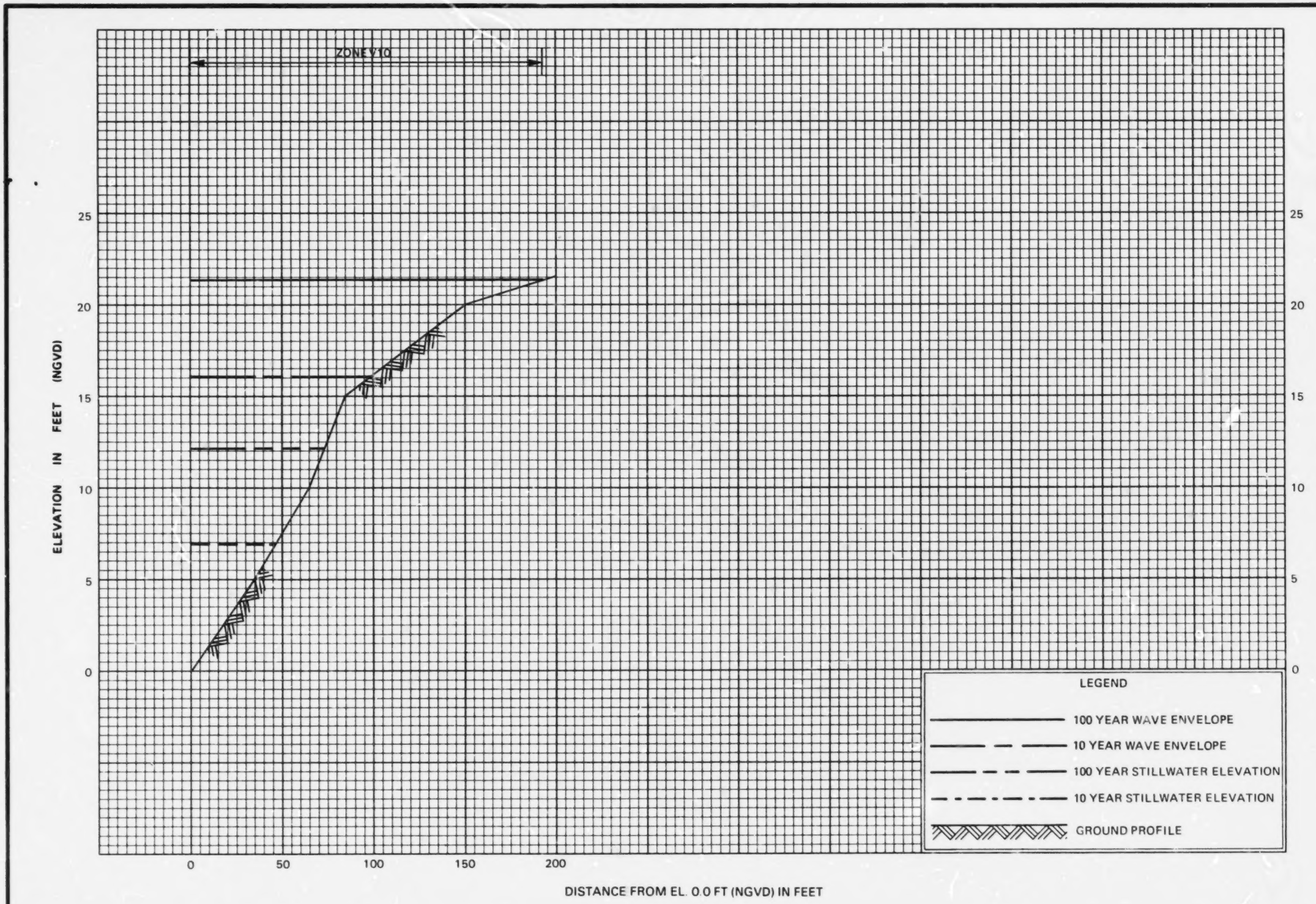
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

05C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 6

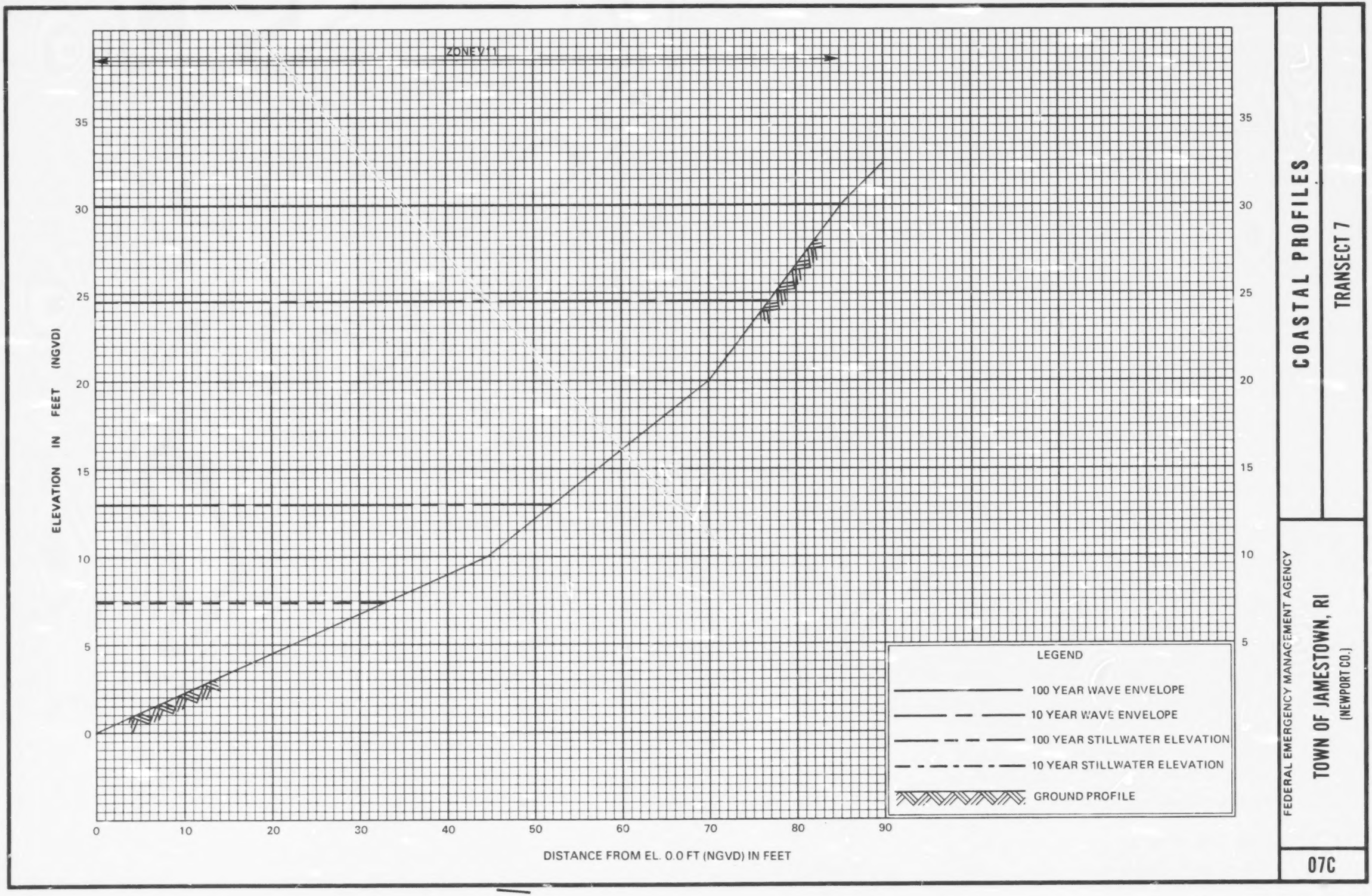
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

06C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

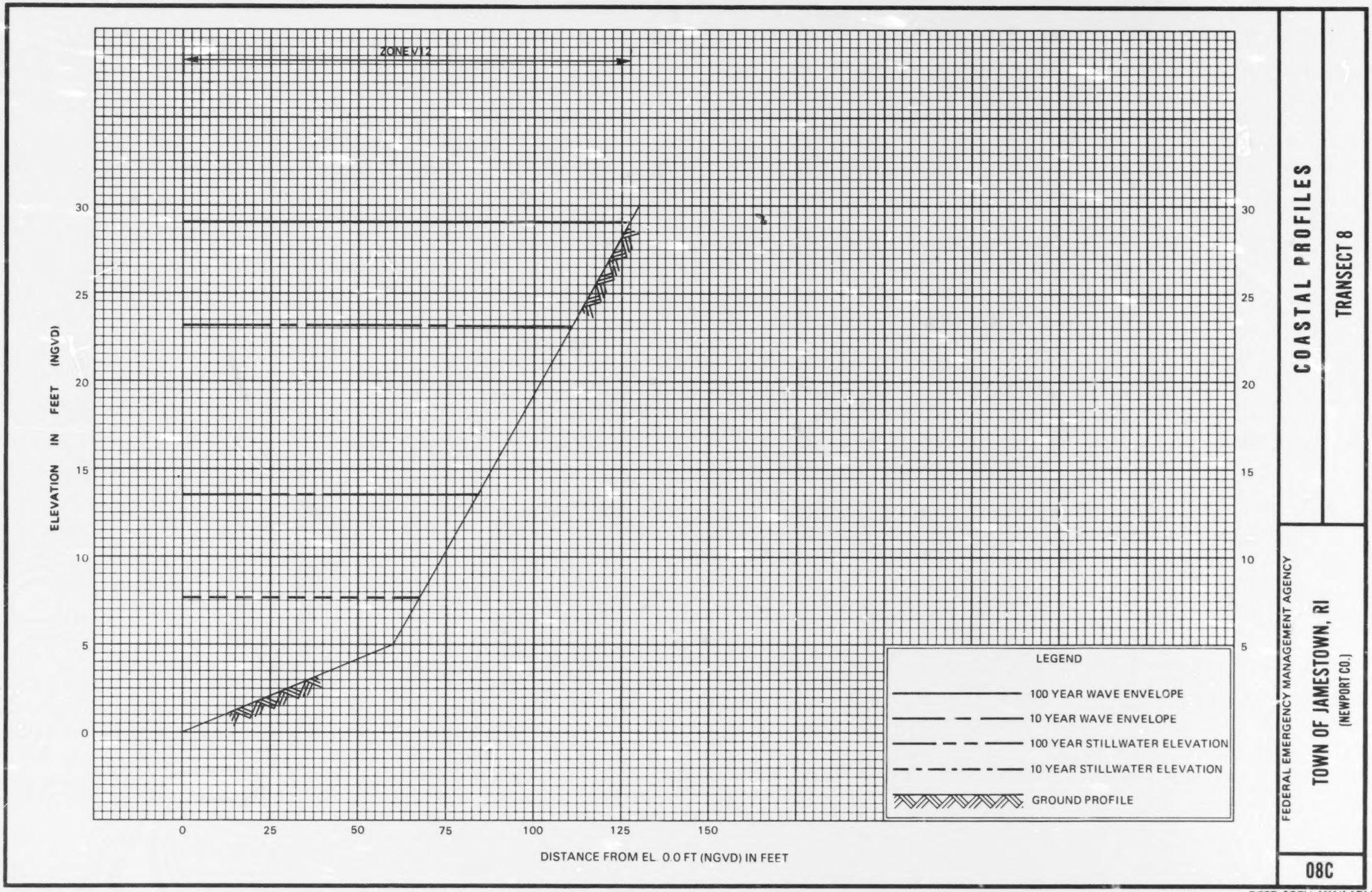
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

07C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 8

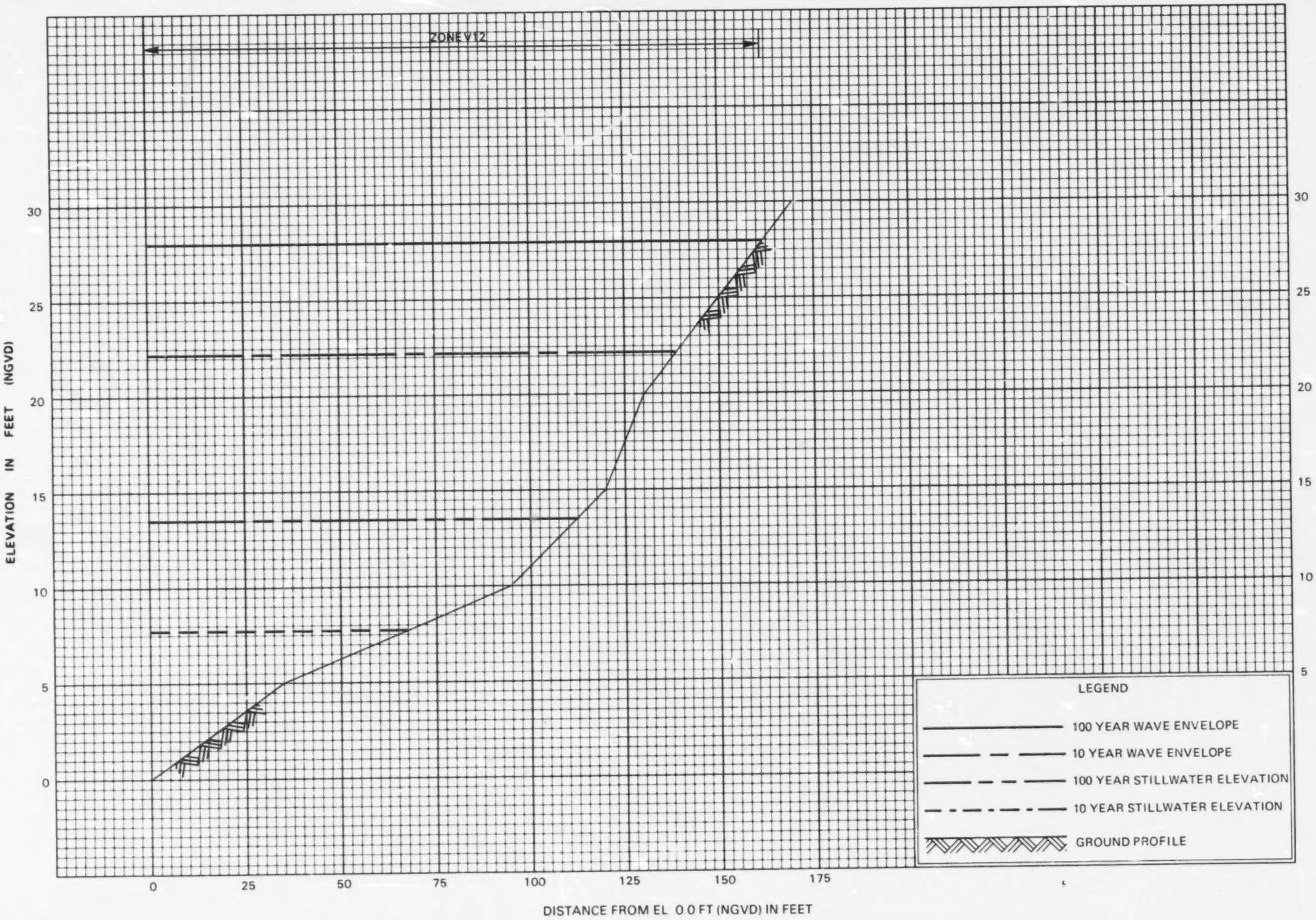
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

08C

BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

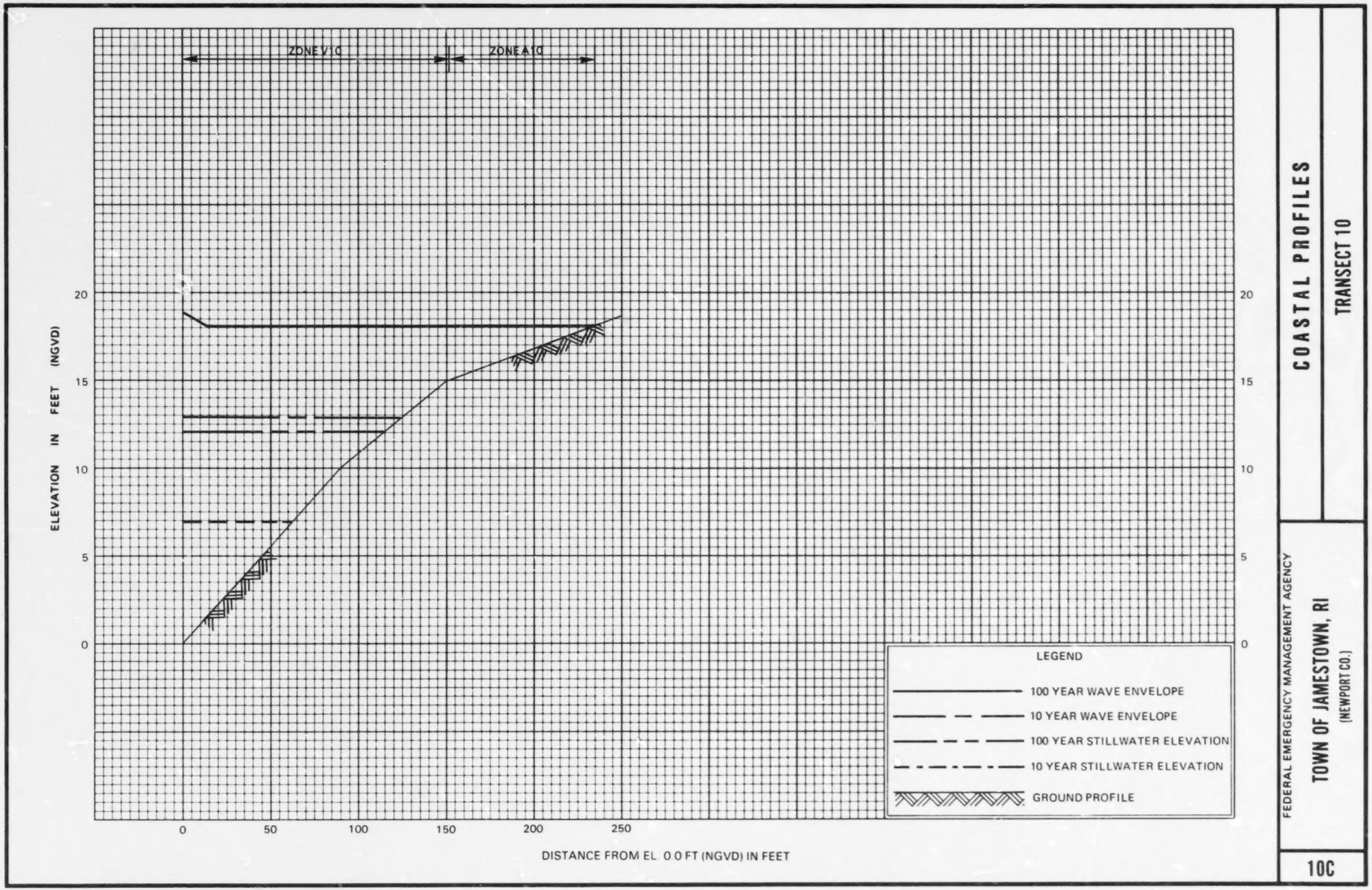
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

09C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

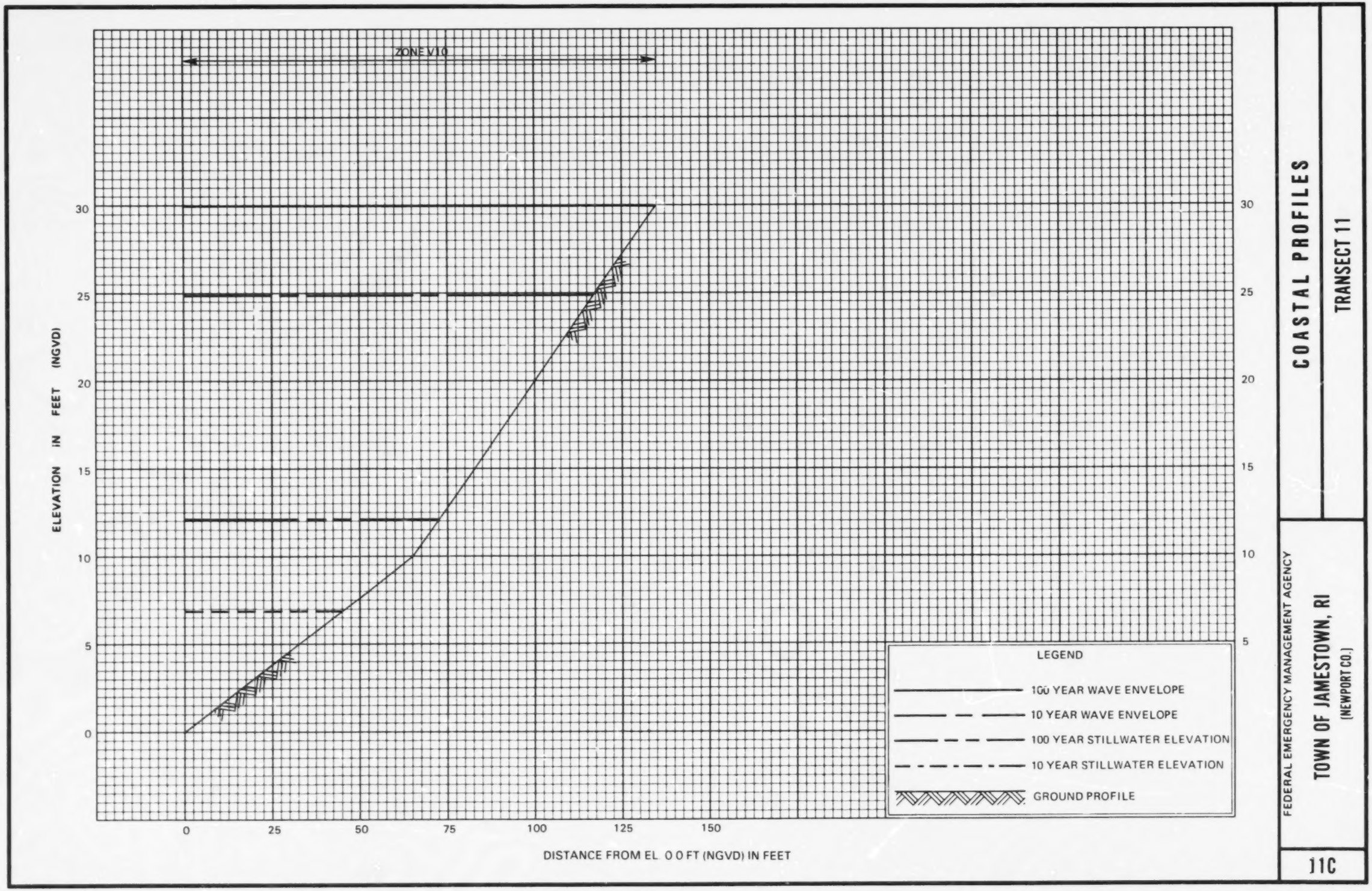
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

10C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 11

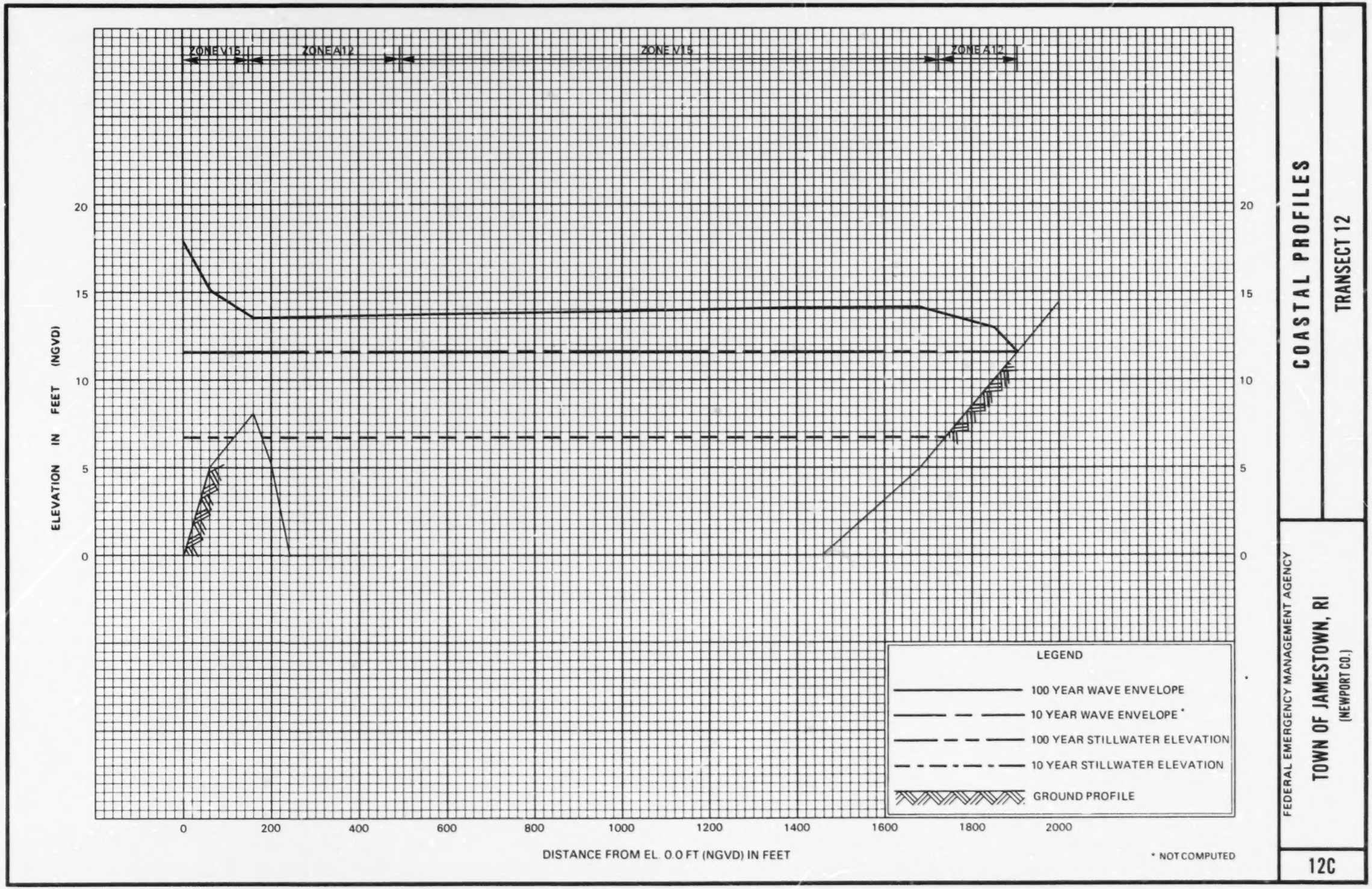
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

11C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 12

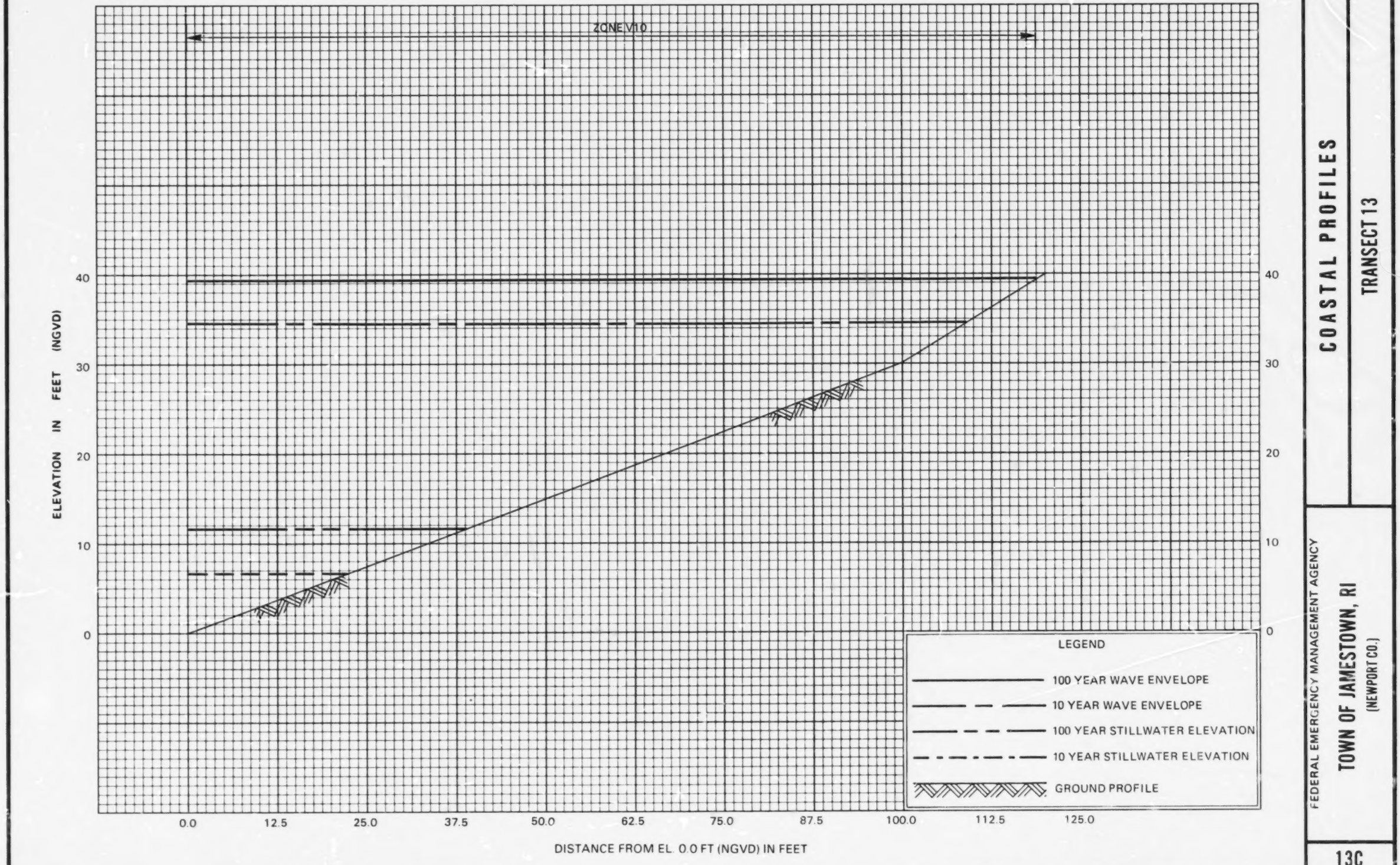
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

12C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

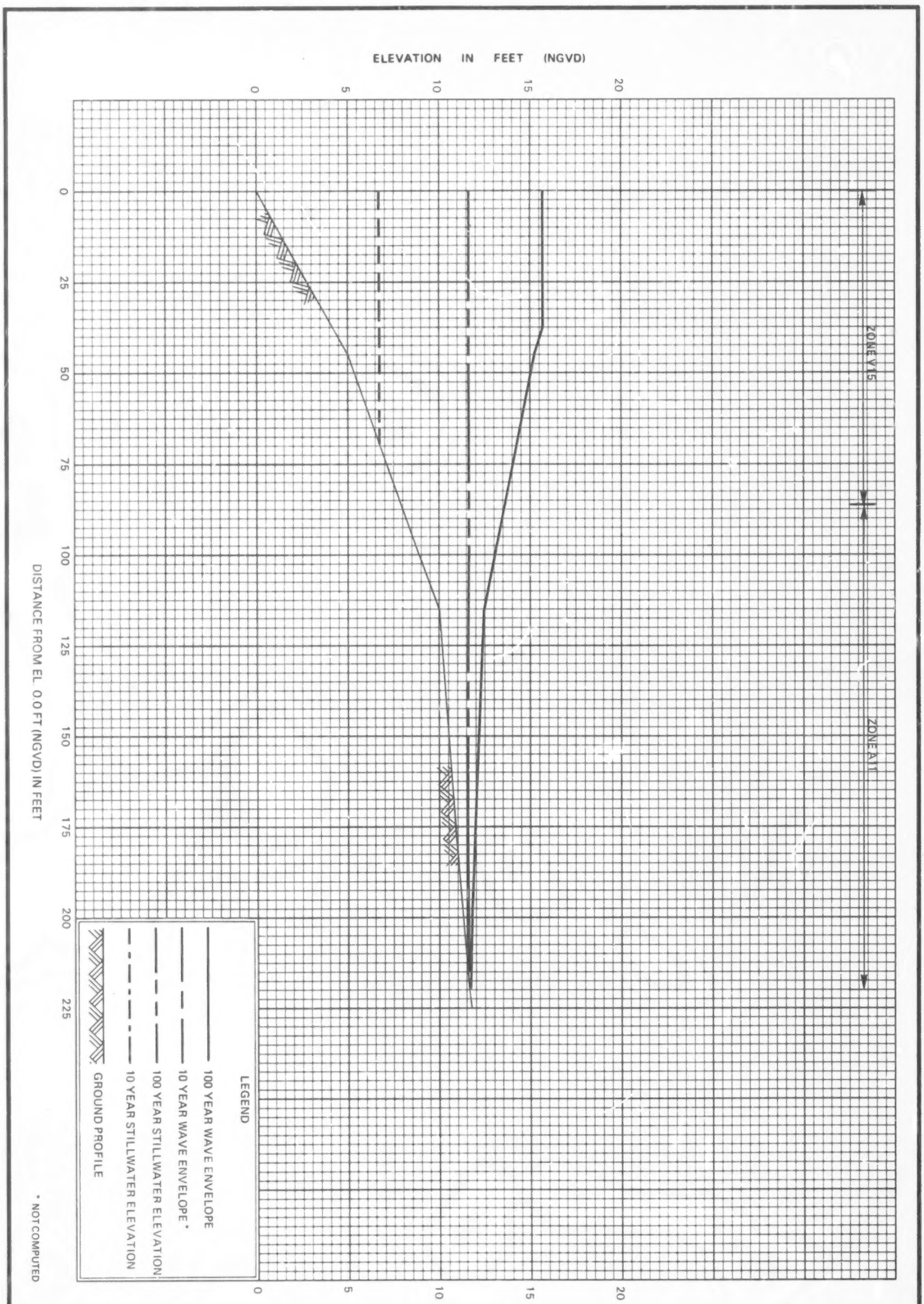
TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

13C



BEST COPY AVAILABLE




FEDERAL EMERGENCY MANAGEMENT AGENCY

**TOWN OF JAMESTOWN, RI**

(NEWPORT CO.)

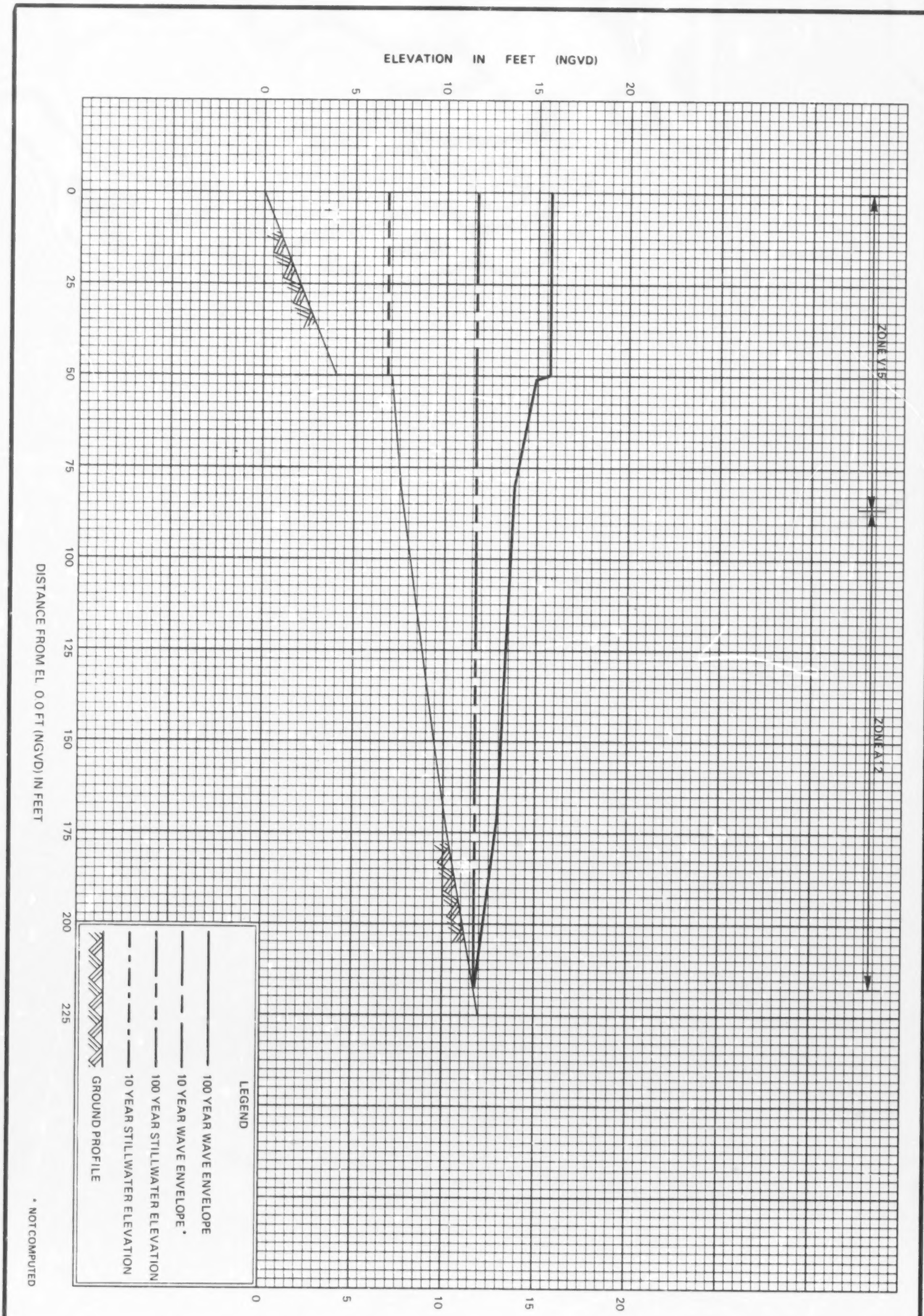
**COASTAL PROFILES**

**TRANSECT 14**

14C

V3

BEST COPY AVAILABLE




FEDERAL EMERGENCY MANAGEMENT AGENCY

**TOWN OF JAMESTOWN, RI**

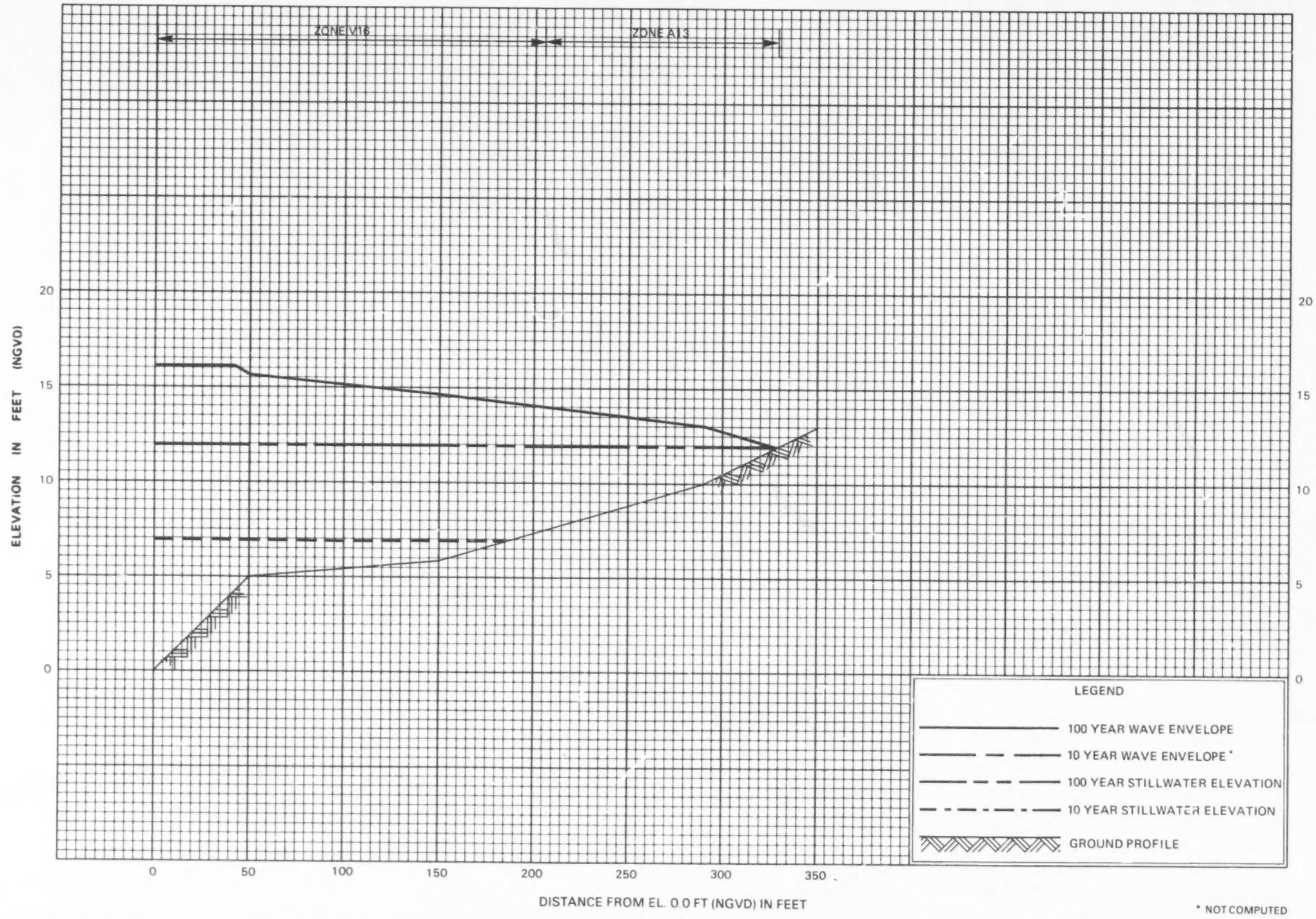
(NEWPORT CO.)

**COASTAL PROFILES**

**TRANSECT 15**

15C

BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 16

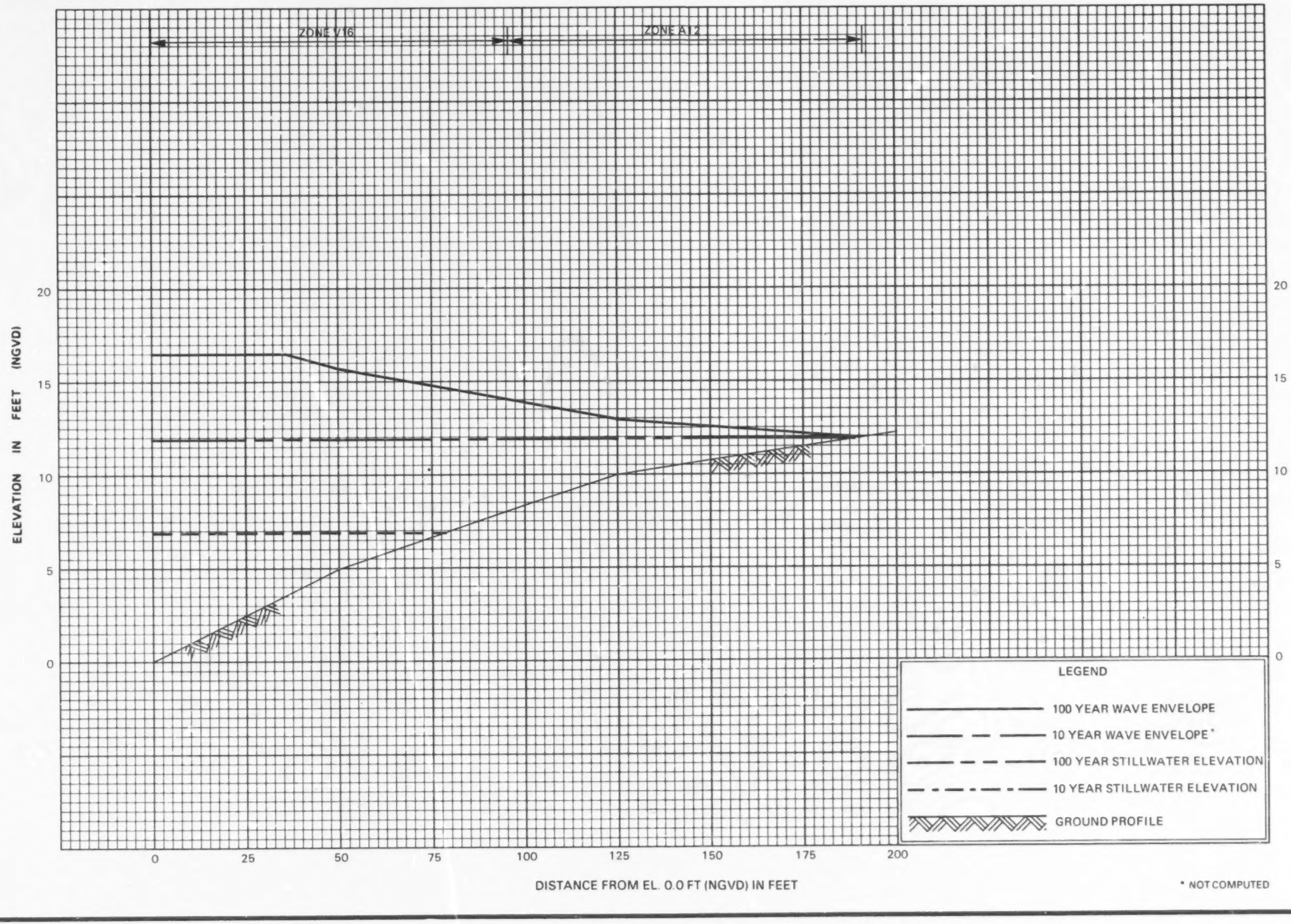
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

16C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 17

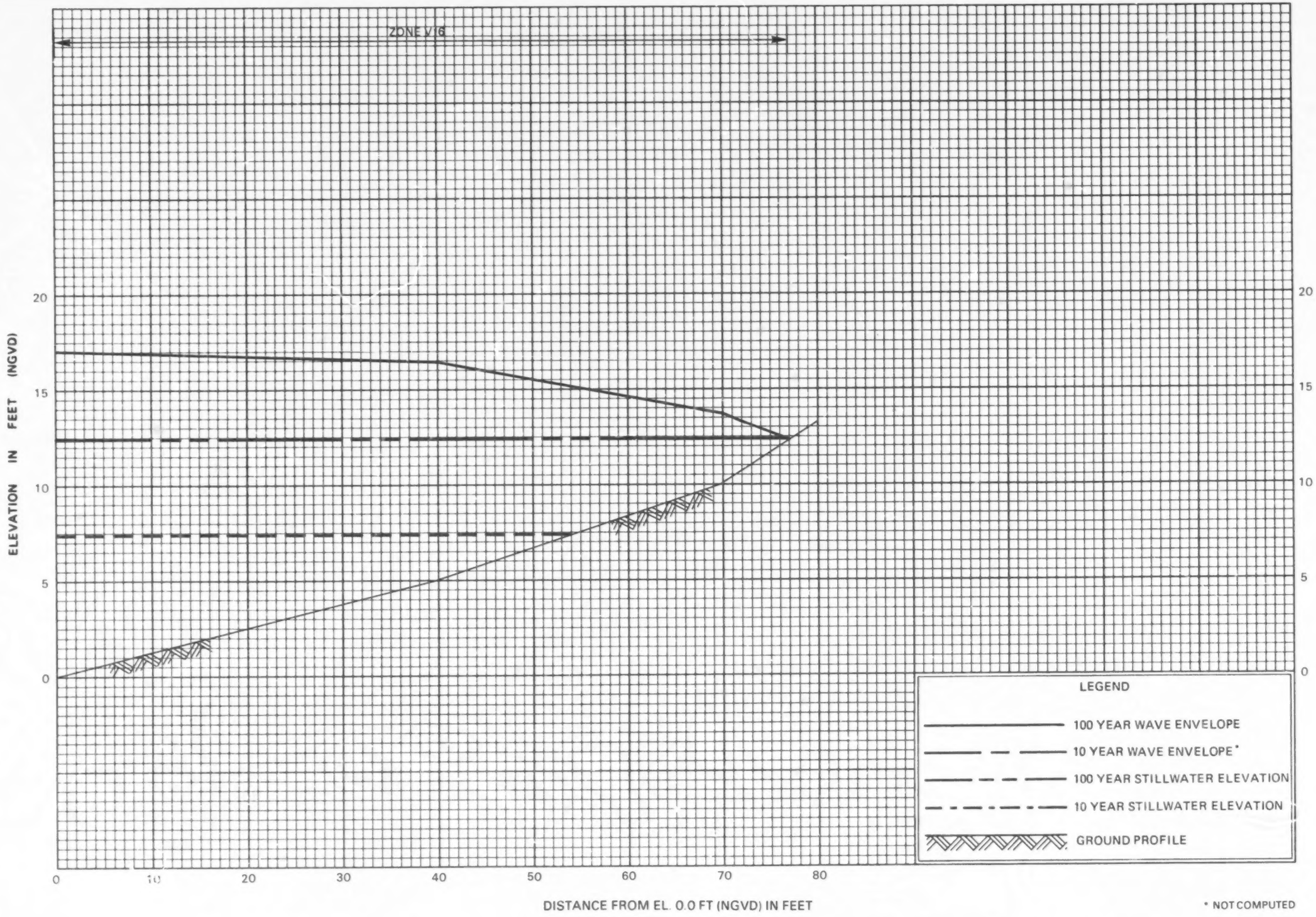
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

17C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 18

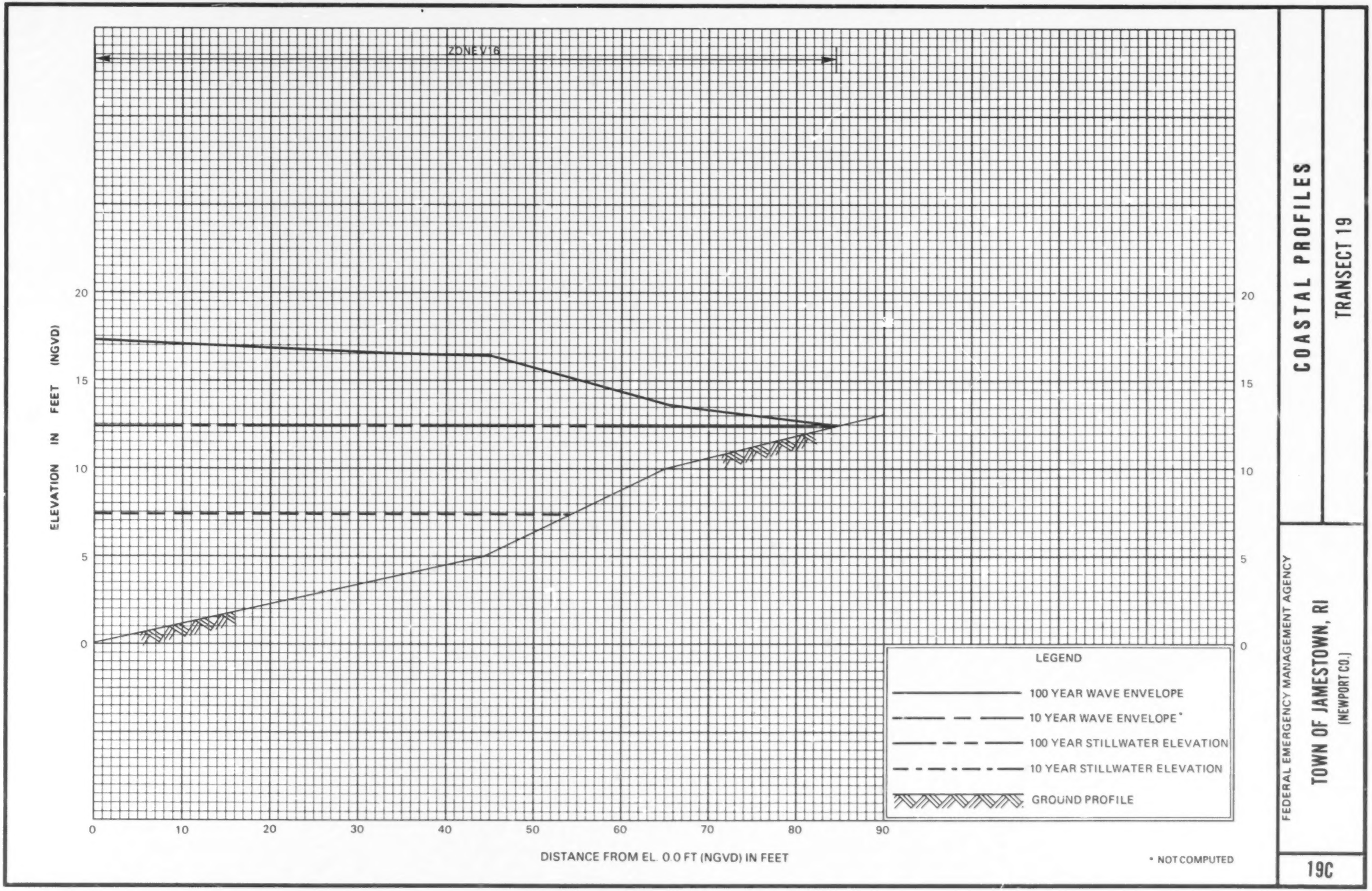
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

18C



BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 19

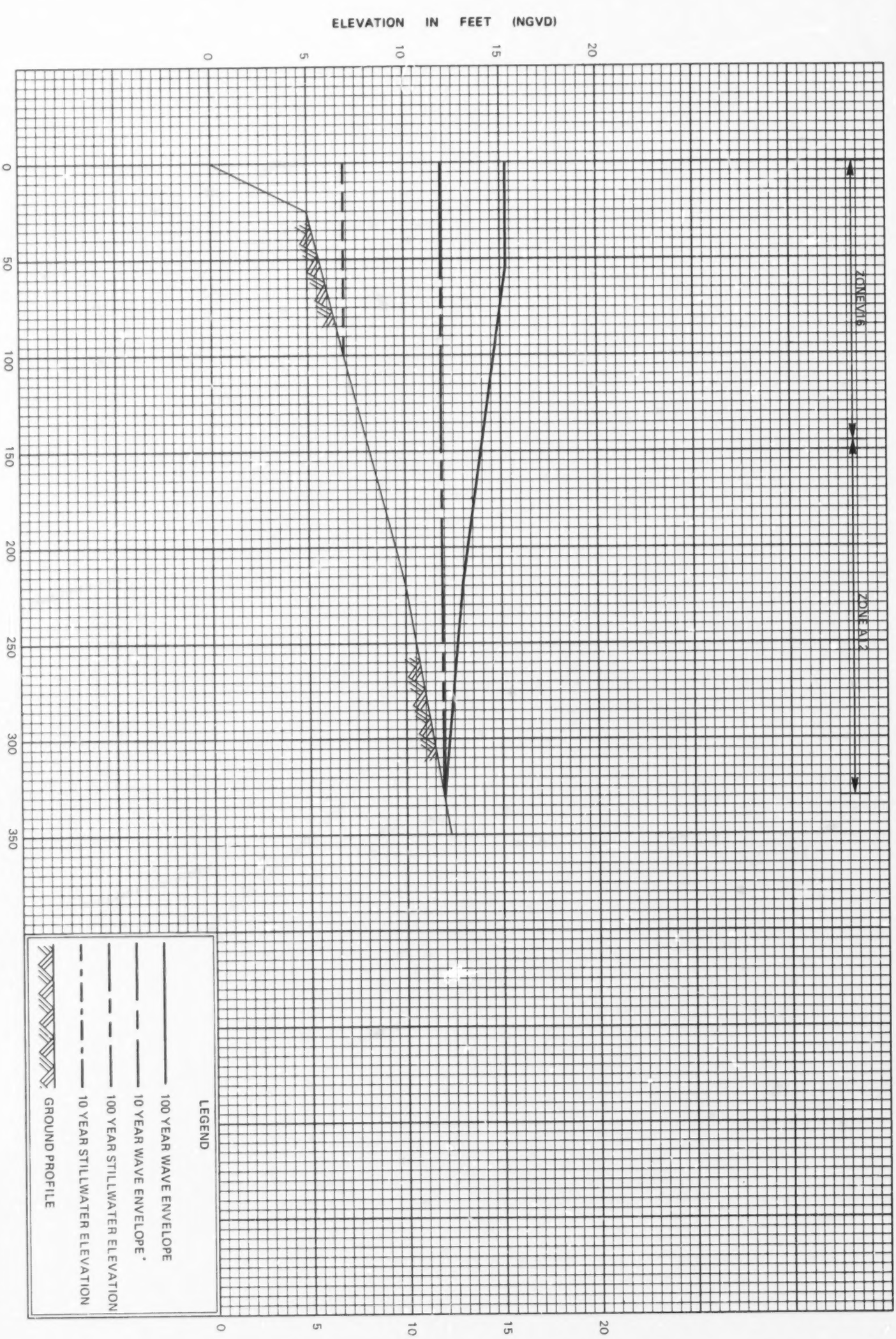
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

19C



BEST COPY AVAILABLE




FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI

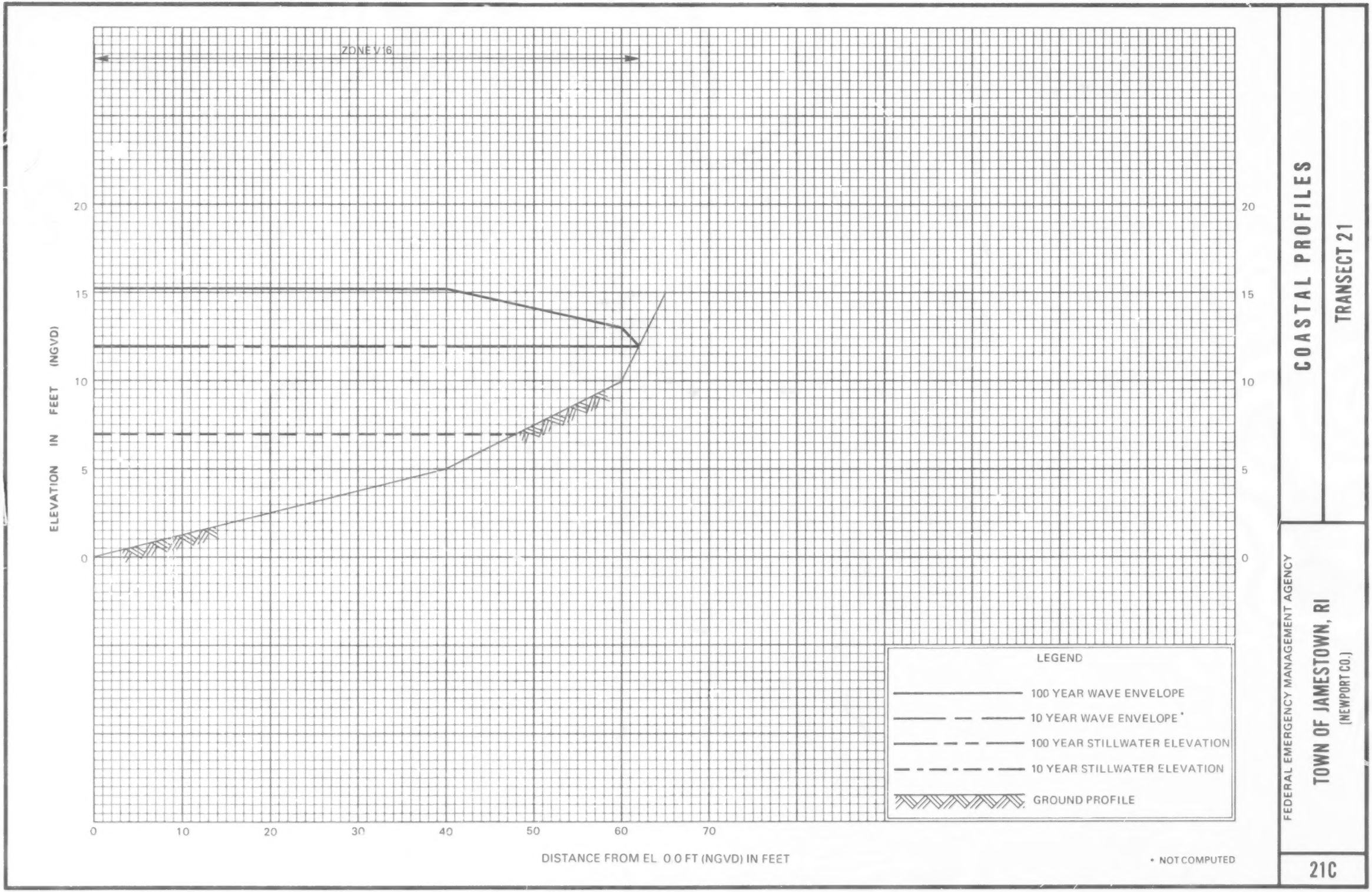
(NEWPORT CO.)

20C

# COASTAL PROFILES

## TRANSECT 20

BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 21

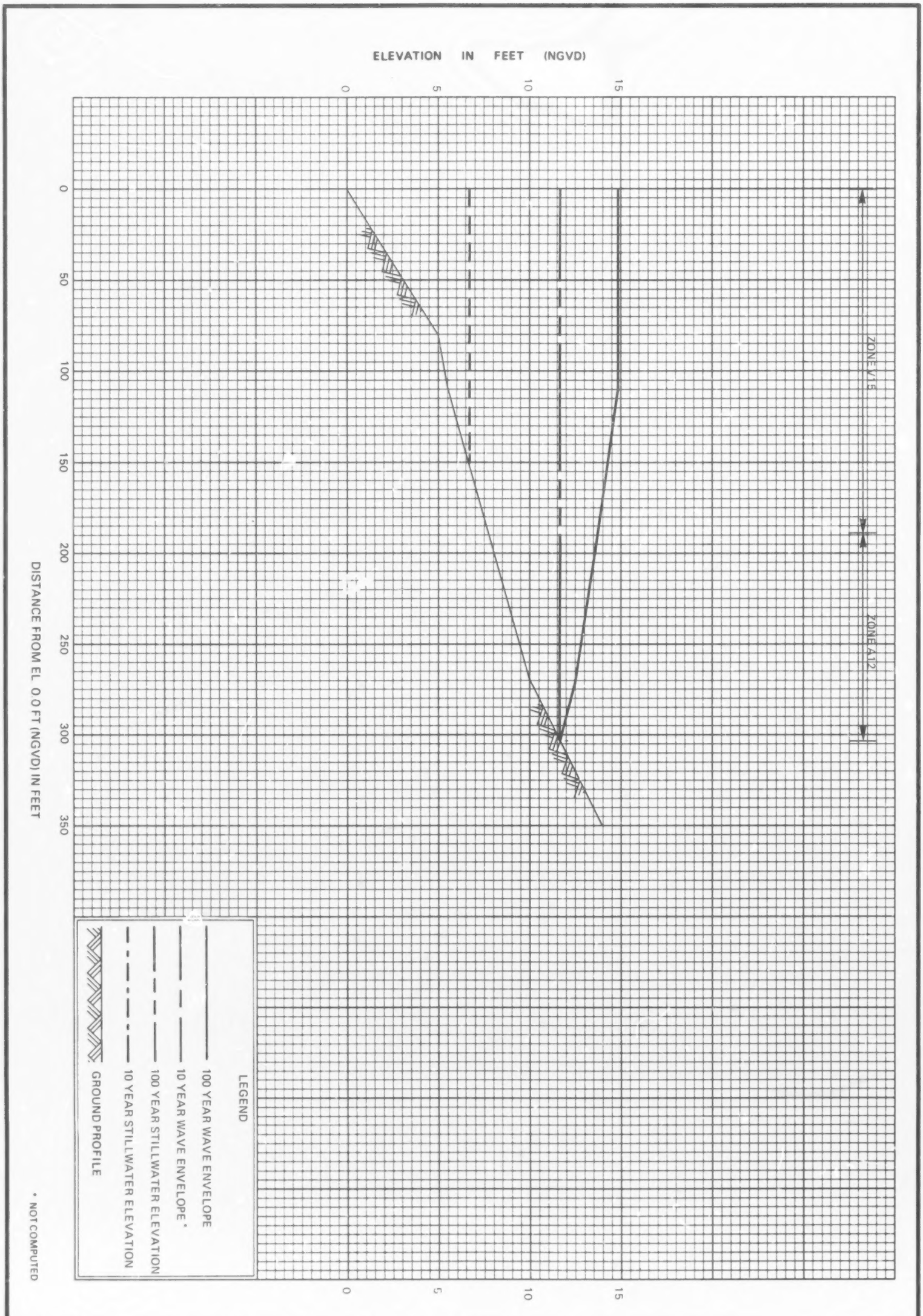
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI
(NEWPORT CO.)

21C



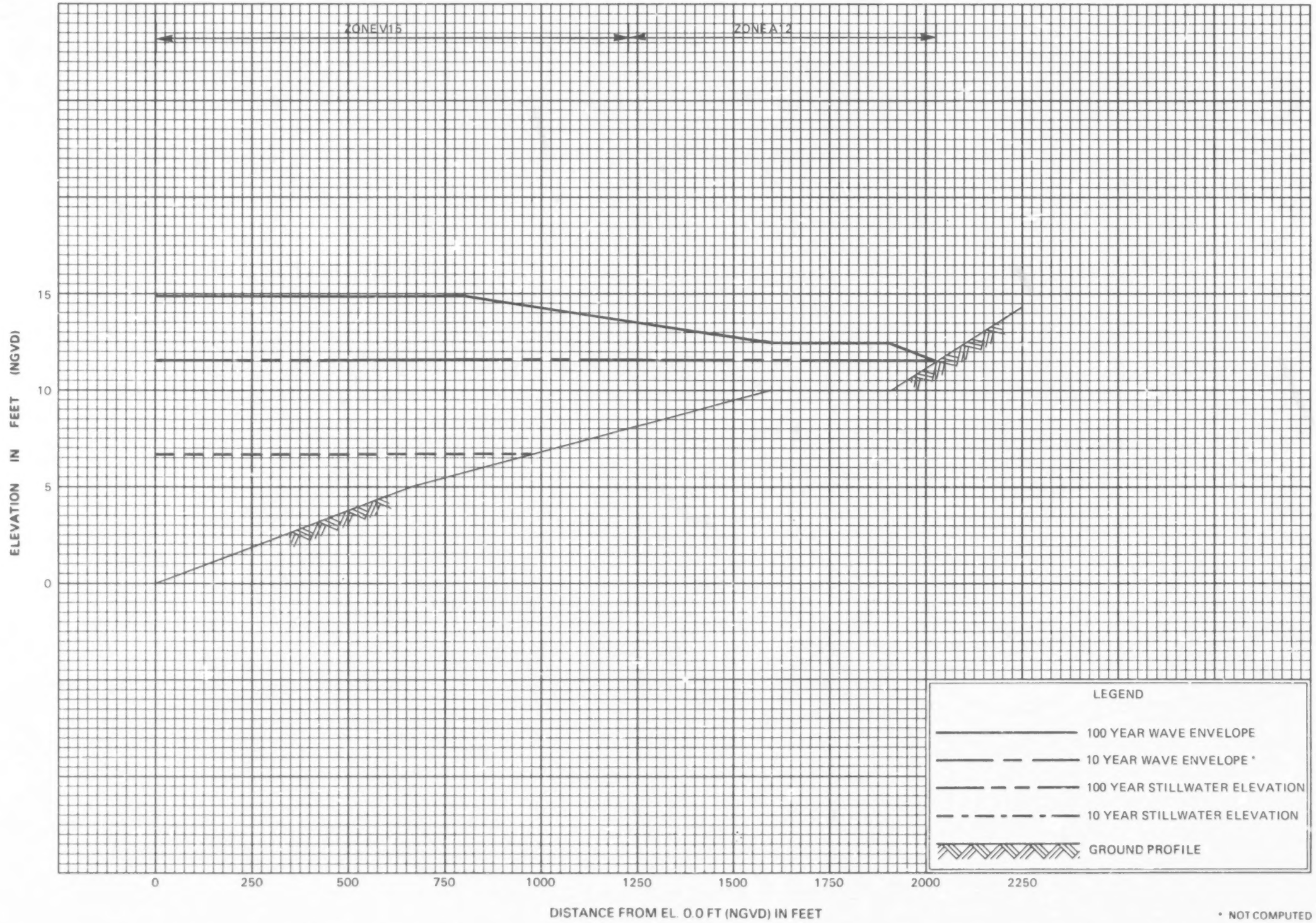
BEST COPY AVAILABLE




| | | |
|---|---|---|
| 22C | FEDERAL EMERGENCY MANAGEMENT AGENCY<br>TOWN OF JAMESTOWN, RI<br>(NEWPORT CO.) | COASTAL PROFILES<br>TRANSECT 22 |

5/

BEST COPY AVAILABLE




COASTAL PROFILES

TRANSECT 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF JAMESTOWN, RI

(NEWPORT CO.)

23C



BEST COPY AVAILABLE